

# OVERSIGHT OF VALUE ENGINEERING PROGRAMS IN FEDERAL AGENCIES

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HEARING  
BEFORE THE  
SUBCOMMITTEE ON  
OVERSIGHT OF GOVERNMENT MANAGEMENT  
OF THE  
COMMITTEE ON  
GOVERNMENTAL AFFAIRS  
UNITED STATES SENATE  
ONE HUNDREDTH CONGRESS  
FIRST SESSION

APRIL 29, 1987

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## OVERSIGHT OF VALUE ENGINEERING PROGRAMS IN FEDERAL AGENCIES

WEDNESDAY, APRIL 29, 1987

U.S. SENATE,  
SUBCOMMITTEE ON OVERSIGHT  
OF GOVERNMENT MANAGEMENT,  
COMMITTEE ON GOVERNMENTAL AFFAIRS,  
*Washington, DC.*

The Subcommittee met at 9:32 a.m. in room 342 of Dirksen Senate Office Building, Hon. Carl Levin, Chairman of the Subcommittee, presiding.

Present: Senator Levin.

Staff present: Linda J. Gustitus, Staff Director and Chief Counsel; Brad Vass, Professional Staff Member; Melissa W. Norton, Minority Counsel; and Frankie de Vergie, Chief Clerk.

### OPENING STATEMENT OF SENATOR LEVIN

Senator LEVIN. The Subcommittee will come to order. We welcome all of you to this hearing on value engineering.

The Department of Defense is saving approximately \$2 billion a year through the use of a process called "value engineering" or VE. Were DoD to have achieved the goal it set for itself on such savings, it could have saved an additional \$2 billion over the past five years.

The City of New York has saved over \$110 million on 17 different construction projects costing about \$900 million by using value engineering, and the Environmental Protection Agency has estimated a rate of return of 20:1 for every dollar invested in the value engineering process.

Given this track record, you would think federal agencies and the Office of Management and Budget would jump at the chance to reduce the costs of federal programs and achieve significant savings through the use of value engineering, but, as this hearing will show, that is not the case.

Although VE has demonstrated an ability to save the government money, our government's approach to this process has been fickle, at best.

The purpose of this hearing is to look at how federal agencies can reduce their costs through greater use of this proven cost-cutting technique known as value engineering. As practiced in the federal government, VE is over 30 years old. Yet, 15 years ago, Senator Jennings Randolph held hearings into why VE was being ig-

nored by many of our agencies, and here we are today—15 years later—asking the same question.

Over the past 20 years, GAO has been both persistent and consistent in praising the importance of value engineering and urging federal agencies to devote additional resources to it. We know of at least 16 reports issued by GAO from as far back as 1969 and as recently as 1985, and some of the titles tell the story: "Opportunities for Increased Savings by Improving Management of Value Engineering" is one of the titles. Another one is "Value Engineering Needs to be Improved and Reinstated in the Maritime Administration." Another one is "Need for Increased Use of Value Engineering, a Proven Cost-Savings Technique in Federal Construction." And on and on and on.

And the Inspectors General have been busy as well, with almost a dozen reports issued in the last few years.

What is VE? Well, we have some very knowledgeable people here today and I don't want to match my knowledge about VE with theirs, but let me try to describe it in simple terms. Although it is referred to as "engineering," you don't have to be an engineer to do VE. It is an analysis and design for cost savings. It is an approach used to achieve optimum value for the money spent by investigating the functions of any item or process, and then eliminating anything that costs money without contributing to the functions.

Here is one physical example of how savings are achieved using this technique.

[See exhibit 1 on p. 4.]

The Army calls this an Expulsion Charge Assembly. It is used to explode the artillery shells after they have been fired. It was originally designed as a cloth bag attached to a metal spring. As a result of the contractor's efforts at value engineering, this item went from the cloth version, which was costing the Army \$4.52 per unit, to this plastic version for which we pay \$1.13 per unit. That is about one-third to one-quarter as much. The Army saved almost \$5 million just in that one little process.

Let me tell you about another example. Mr. Julian Peterson, an employee of the Tank and Automotive Command in Warren, Michigan suggested that track shoe assemblies for tanks be packaged differently to avoid excessive use. Because shoes were being packaged in boxes of eight, even though the person ordering them may have needed only one, new shoes were being substituted for old shoes regardless of whether or not they actually needed replacement. The Army applied the VE methodology to this proposal, developed a different packaging scheme, and the result was an estimated first year savings of about \$20 million. I am pleased to add that Mr. Peterson was also awarded some cash for his idea.

The Department of Defense has achieved tremendous savings from its VE program, close to \$2 billion annually, as I indicated. No doubt this is in part attributable to the commitment made by individual managers in DOD. I understand, for example, that the Assistant Secretary of the Navy, Everett Pyatt, meets semiannually with his top commanders to discuss VE goals and achievements. At the same time, however, as I said earlier, if DOD had met its goal for VE savings from the contractor community over the past

five years, it would have saved another \$2 billion. That potential is simply too great to ignore.

Moreover, the opportunity for additional savings exists in almost all the other agencies. But from the survey conducted by the subcommittee staff, it is apparent that many agencies have no VE program whatsoever, while others are foregoing significant savings by inadequate utilization of the VE process.

Our survey of ten major agencies found a number of problems. Agencies either don't have any VE program, or they have a program in headquarters but not in the field; or they report that they have a program but at the same time they don't know what they invest in VE and they don't know what their VE savings are, and they don't have any full-time VE people.

For example, the U.S. Postal Service reported to us that it has no VE goals, has not a single employee assigned full-time to VE, has not trained a single employee in VE during the past five years, and has no record of any VE proposals being received during that period of time.

Let me read you one sentence from a 1982 GSA IG report, regarding the IG's attempt to audit GSA's VE program. This line may tell us more about the status of some agencies' VE programs than a week of hearings would tell us. And I quote from the IG's report: "We have canceled the audit because the survey indicated that no viable VE program existed." While I can think of some federal programs where I wish the IG could use that line, VE is not one of them.

The amount of increased savings that might be expected from the civil agencies is unknown; however, audit reports suggest that the sum would be significant. For example, a 1985 Department of Transportation report states that an additional \$150 million could be saved annually if the Federal Highway Administration would expand its VE program into additional states. A 1987 report by the same IG points out that \$6.6 million could have been saved if VE had been applied to certain construction projects by the Urban Mass Transportation Administration.

In a time of growing federal budgets and increasing federal deficits, we just simply cannot overlook any opportunity to save federal taxpayer dollars. Yet, the history of VE—which is a proven method for reducing costs—in the federal government is one of inconsistency and instability. It waxes and wanes, runs hot and cold, despite the fact that the potential unrealized savings could total into the billions of dollars. Successful VE efforts require the attention of both top and middle-level management. At the same time, it is clear that without some greater impetus than presently exists, we will not realize the full potential of VE.

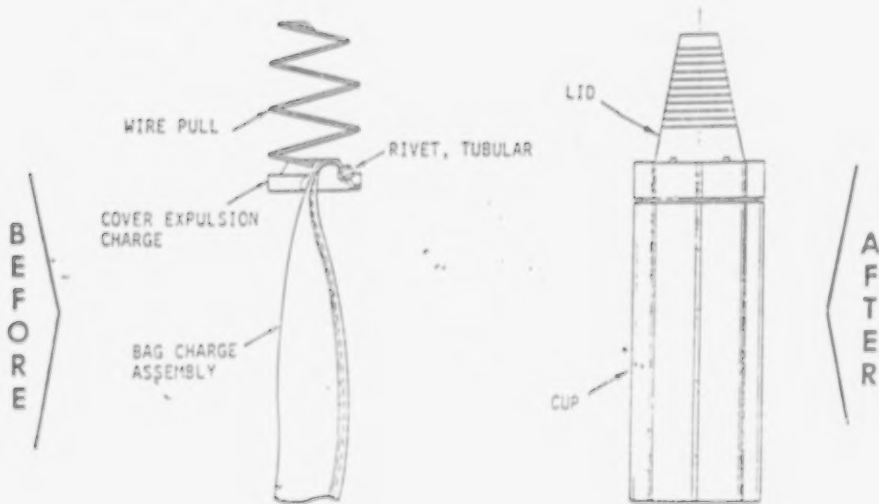
The hearing today will focus on the opportunities available to us in the federal sector to apply and benefit from VE, will address the inadequacies that currently exist in the VE programs of federal agencies, and will approach the issue of what we can do to maintain a more consistent and higher profile for the use of VE in federal programs.

[Exhibits submitted by Senator Levin follow:]

XIII. Expulsion Charge Assembly

EXHIBIT 1.

**DAY & ZIMMERMANN, INC. VECP KS-4012-154**  
**PLASTIC EXPULSION CHARGE ASSEMBLY**  
**FOR M483A1 - 155MM PROJECTILE**



BAG  
ASSEMBLY \$4.52

PLASTIC CUP  
ASSEMBLY \$1.13

UNIT SAVINGS \$3.39

**3 YEAR SAVINGS FOR THE US ARMY**  
**\$4,680,000**



## EXHIBIT 2

VE SAVINGS (\$MILLIONS) IN 10 AGENCIES SURVEYED BY SUBCOMMITTEE

| AGENCY         | 1981 | 1982                               | 1983  | 1984  | 1985  | 1986 | TOTAL |
|----------------|------|------------------------------------|-------|-------|-------|------|-------|
| DOT            | *    | *                                  | *     | 134.0 | 147.0 | 60.0 | 341.0 |
| EPA            | 64.0 | 76.3                               | 142.5 | 98.2  | *     | *    | 381.0 |
| VA             | 2.9  | 18.0                               | 5.5   | 7.9   | 5.0   | 8.0  | 47.3  |
| HHS            | 0    | 0                                  | 0     | .1    | .1    | 0    | .2    |
| DOI            | 0    | 0                                  | 0     | 2.0   | .3    | 5.1  | 7.4   |
| DOE            | 0    | .1                                 | .9    | .7    | 4.1   | 15.9 | 21.7  |
| GSA            |      |                                    |       |       |       |      | 11.5  |
| HUD            |      | (NO VE PROGRAM)                    |       |       |       |      |       |
| NASA           |      | (NO RECORDS MAINTAINED ON SAVINGS) |       |       |       |      |       |
| POSTAL SERVICE |      | (NO ACCOUNTING FOR SAVINGS)        |       |       |       |      |       |
| TOTAL          | 66.9 | 94.4                               | 148.9 | 242.9 | 156.5 | 89.0 | 810.1 |

\* data not available

Senator LEVIN. Senator Bingaman, who could not be here, has a short opening statement and it will be inserted into the record at this point.

[The opening statement follows:]

OPENING STATEMENT OF SENATOR BINGAMAN

Thank you Mr. Chairman for your effort in conducting this important hearing this morning. With the Budget deficit condition that we have today, we must be resourceful and innovative in finding ways to reduce program costs. Although the concept of Value Engineering has been around a fairly long period of time, according to today's changing times, I do not feel it has been utilized to its full capability in Federal Programs.

Value Engineering has proven itself over time to pay for itself and produce considerable saving. Since 1969, the General Accounting Office has issued reports and letters citing the need for increased use of value engineering in Federal Programs. Previous congressional hearings have been held on this subject and noted the benefits of VE programs. However, no legislation has been issued to require increased attention to Value Engineering Programs.

I look forward to the testimony of the witnesses that the Chairman has assembled today. I certainly hope that the outcome of this hearing will result in increased emphasis in Value Engineering Programs that produce considerable savings.

Senator LEVIN. Before I call on Mr. Dell'Isola as our first witness, let me mention that we had also invited Lawrence Jensen, the Assistant Administrator for Water Programs in the EPA to testify on the VE program that is mandated in the Clean Water Act.

Due to our time constraints, we have asked him to submit his statement for the record. It is an excellent statement and we thank him for his effort. The full statement will be made part of the record.<sup>1</sup>

Let me just read one or two lines from Mr. Jensen's statement before I call on Mr. Dell'Isola.

Mr. Jensen stated that as an initial effort, "Our VE program has produced impressive results. In the first eight years after we initiated a mandatory VE program, years 1977 to 1984, a total of 346 studies have produced capital savings of over half a billion dollars at a total cost of only \$30 million. This represents a savings of \$18 for every dollar spent on VE."

And he stated, "Our VE program has made excellent progress over the years, especially in the savings-to-cost ratio. Beginning with a 12:1 ratio in Fiscal Year 1977, the average ratio has been trending upward with a 34:1 ratio reported for Fiscal Year 1985.

He also wrote that based on his experience, he believes there are several compelling advantages and no disadvantages of requiring VE on smaller projects.

That entire statement will be made part of the record, and again we are very grateful to Mr. Jensen both for preparing this testimony and for his understanding of the time constraints which we face this morning, which required us to ask him that we put his statement into the record rather than have him testify in person.

The first witness that we will call this morning is Mr. Alphonse Dell'Isola. Mr. Dell'Isola has over 25 years experience in conducting and supervising the conduct of value engineering studies. He has also conducted workshops and seminars in many countries, as

<sup>1</sup> See p. 214.



well as state and local governments, and has conducted VE studies for many federal agencies.

Mr. Dell'Isola, we welcome you and thank you.

**TESTIMONY OF ALPHONSE J. DELL'ISOLA, VICE PRESIDENT,  
SMITH, HINCHMAN & GRYLLS ASSOCIATES, INC.<sup>2</sup>**

Mr. DELL'ISOLA. Thank you for inviting us. It is about 20 years since we went in front of Senator Randolph. We have survived 20 years, and we are back again giving it another crack.

Senator LEVIN. If he were here, I am sure he would say that you look younger.

Mr. DELL'ISOLA. By the way, my illustrious boss in Detroit sends his regards, Mr. Phil Meathe. He said to say hello to you.

Senator LEVIN. Thank you. He is a good, dear friend of mine, as a matter of fact.

Mr. DELL'ISOLA. He said the same thing about you.

I would like to cover some of the key areas. Your staff has limited my talk down to some essentials, so we are just going to cover the highlights. If you refer to the testimony, I will hit some of the key points.

I think we will start off first with a definition of value engineering. Value engineering basically is a management plan, an organized approach, that dedicates time and effort towards the realization of optimization of costs. I would like to start out by talking about costs. I think we have to open up the parameter of costs not only to capital costs, but to the total costs, and that includes the follow-on costs to run, staff, maintain, and operate. This parameter gets more and more significant as the years go on.

So as we are talking about optimizing costs, we are not talking about the narrow viewpoint of capital investment; we are talking about the fact that you have to own it and operate it and make it achieve a goal.

The other key thing that we are talking about is we are talking about optimizing costs without sacrificing needed qualities or performance areas. In other words, we are not saying, let's take a 14-story building and we have got to reduce its costs so it ends up 12 stories. That is not what we are talking about.

What we are talking about is looking at the functions that have to be required and achieving those requirements at less total costs. So we are not talking about making anything cheaper or making it of less quality than needed. We are not talking about a cost reduction program. Our efforts are to take your requirements and realize these at the lowest overall cost.

There are some essential ingredients. There are the three things that have to be realized in order to establish programs. These are: executive involvement, substantive investment, and a systematic effort.

In establishing programs, these three ingredients are essential to a successful program. When you look at some of the government agencies and look at how they started, and why they are no longer

<sup>2</sup> Mr. Dell'Isola's prepared statement and attachments may be found on p. 33.

in VE, or why the agencies are not producing significant savings, it is because of lack of one of those essential ingredients.

I would like to follow up and talk about how we might get more executive involvement, and what kind of an investment we are talking about, and the systematic effort.

The systematic effort basically is what is called a value engineering job plan, which is nothing more than the scientific approach to problem solving. This says, before you solve a problem, find out what your problem is—which is usually a pretty good idea—and then follow through using creativity, using a multidiscipline team approach, and using resources.

In other words, it is much harder to save money than to spend money. Yet, when we look at the efforts we dedicated towards saving money, vis a vis spending money, they are dwarfed. Why not take a look at the overall perspective and say, why don't we invest some money in saving money, especially when we can get the kinds of returns mentioned.

The kinds of returns we are getting for private clients exceed 100:1 and we have some clients at 1,000:1. With those potentials, why can't we interest executives to get involved? Why can't we get them to dedicate a small level of funds. Why can't we then force them to follow an organized approach so that the effort doesn't get either dewatered or ineffective and you end up with everybody antagonistic and no results?

I would like to focus, then, on table I because I think this is the key sheet of the testimony. What we have done is recap some ten agencies and organizations that presently have VE programs, to give you, the subcommittee, an idea of what kind of potential is out there and what is being realized.

And in flashing down these agencies, you see the EPA which you have quoted, are spending \$20 million to realize \$300,000,000.

Senator LEVIN. Three hundred million?

Mr. DELL'ISOLA. Three hundred million is from 1981 to 1984.

We have the Department of Transportation, which has a huge program, and are just beginning to get results when you start looking at the percent of savings on the total.

Then you have the Corps of Engineers and the Navy, which I am very familiar with—having set up the programs initially some 20 years ago—and you can see what they are doing is getting 5 percent of their total expenditures in savings. When you compare that with the other agencies, you can see that there is a lot of potential remaining.

Then as we go down the list, the Army Materiel Command, which is a procuring type agency, 3½ percent, or \$2 billion—which is a nice round number when you look at the expenditures and the kinds of savings that result.

The Office of Management and Budget is one of the key ones that I will describe later, because I think the way they are approaching their program, some of the ideas and the techniques they are using would be applicable to try to expand for use by this Subcommittee.

Then, there is United Technologies, which has realized an astounding 20 percent savings. The 20 percent savings is not only on initial cost, but on total cost. They are the only agency listed that

documents follow-on savings. In other words, they are not only documenting initial cost savings on capital investment, but we are taking the present worth of the annual savings that occur. And, that is the kind of results you can get.

If we took these government agency programs and said let's not only look at initial costs, but expand it to present worth of annual savings, you could be looking at that order of magnitude of savings not only on your initial capital budget, but on your follow-on budget allocations for maintenance, operation, and staffing.

Lastly, we have a program in the Kingdom of Saudi Arabia where we have a staff working for the General Directorate of Military Works. In the first 6 months we have isolated over \$300 million in potential savings that is being implemented. In that program, I want to cite that later on, some of the things we are doing there that might have application.

If we move on to table II, I would like to go over the United Technology program because it is using the total cost approach vis a vis a strictly capital cost reduction, which I think is very pertinent to this testimony.

You can see what basically has happened is that over the past three years, we have looked at some 40-odd projects and identified a capital savings of around \$36 million and an O&M savings of \$2 million a year. This equates to a present worth total savings of around \$60 million and a 170:1 return on investment.

So I think the figures of the 20:1 ROI is just barely scratching the surface if the viewpoint of the program is expanded from a narrow initial savings to a total cost savings.

I would like to show you or illustrate the kinds and type of agencies under UT because when we look at NASA and DOE, we can't justify why they aren't in the program. The projects that NASA has given to the private sector are the ones we are presently value-engineering for UT. We are doing a silicon chip facility, a pressure test station, and an elevator test stand. We are doing turbine blade facilities, as well as rocket launch facilities.

We worked for NASA many years ago, but the program has since been disbanded. The fact that NASA says that their type of program is not applicable when you look at what we are doing in the private sector on very similar programs.

If we move over to table III, we see the City of New York. What is unique about the City of New York, and the reason they went to value engineering is, I think, very important.

In the past two to three years, not one major project in the City of New York met budget. Does that sound familiar? So the Office of Management and Budget had to do something, because obviously what they presently were doing was not effective. We talked to them about a value engineering program which says, let's conduct discrete, focused reviews at milestone dates during the project development, with people not involved in the original decisionmaking, with experts in their field. We recommended starting with program development, because what is the use of producing a very effective product if you find out it is not really what you wanted in the first place.

So the initial reviews started at the development of the program. It also was at the OMB level. At the OMB level, we found that we

could challenge the project reasons. When we get involved with VE at a lower level, we could never challenge the project criteria.

For example, once an agency gets assigned a project, their assignment is to build that project basically within their funds. They don't question the essence of the project. The project could be on for three or four years, and its very existence might be questionable, and nobody questions it. Once it gets in the pipeline, it goes on because nobody is questioning the basic functions of why that project was created.

A typical example was a project in New York which was a barge inloader facility for the refuse—you know, the problem they are having now in New Orleans? Well, they were planning a refuse unloader facility. This project had been in the pipeline some eight years. It finally got out of the pipeline to be budgeted.

We did a study on it and we looked at the economics. When the project was created, there was 20 years of useful life left in the landfill. Eight years had already passed. By the time they got the project on line, there was only five or six years of useful life to the landfill. So you are going to spend \$200 million on an unloading facility with only a useful life of five or six years?

Who in the pipeline looks at these kinds of perspectives? It takes somebody with fiscal responsibility that can challenge and stop a project, because once it gets down to the construction level or the facilities level, it goes by its inertia.

Also, we are questioning the development of a computer network in which every city agency is developing their own computer systems and can't tie in and talk to one another.

You see Citynet on table III. Major savings are going to be occurring because of the questioning and challenging and having somebody with fiscal responsibility that could say, we could better spend the money on this project in other areas under our perusal.

So that is the importance of the City of New York projects.

I am going to wrap this up with some conclusions that will include some of the recommendations. Based on some 600 of these studies over the past 30-some years, and having set up programs in some 25 government agencies, 25 corporations, and 25 foreign countries, you begin to have a sixth sense as to what you can do and where are the areas that movement can occur.

No. 1, nothing will happen significantly unless it is mandated. And this was typical of the DOD program. When we started the DOD program, everyone said it couldn't happen. When McNamara said it will happen, what happened? It did happen.

So it has to be mandated. People will not voluntarily save money unless they are required to. So a mandated program is essential to get results.

No. 2, I think that there has to be an overview at a fiscal responsibility level rather than a technical subagency level. There has to be an overview. There has to be a place where the results, where the ideas and the recommendations that are developed are over-viewed with a greater need criteria involved, like the City of New York.

No. 3, there should be a way to make the program self-funding. In Saudi Arabia we are taking 3 to 5 percent of the savings that are implemented by the program, which reduce appropriations, and



setting it aside for further development of the program and for required efforts to realize its implementation. We lose too many savings because funds are not readily available.

And, if you go through the procurement process, it can take three to five years to realize the money. To try to develop some sort of self-funding, I think would be essential.

Next, there has to be some consistency in VE application for large expenditures. Any agency that spends money can save money. The only areas where I would be cautious are those programs that are legislated: compulsory programs, social security payments, veterans' benefits—difficult to save money. But every other agency, such as NASA or DOE, that is spending large sums of money can save significant costs if they apply these techniques. There has to be some consistency. You can't say this agency is exempt and this other agency has application.

Overall, I think the stress has to be in some enlightened awareness. The hardest thing to overcome is habits and attitudes. When we are dealing with trying to implement programs, it's the human factors that create the greatest roadblocks.

When I hear, "There is not one cent of fat in my \$200 billion budget," I don't believe it. When I hear somebody saying that "If we remove \$2 from this program, the whole U.S. economy would crumble," I don't believe it. I think there has to be a change. There has to be an enlightened awareness to increase efficiencies.

I would like to end with a story that is always dear to my heart, and that is the one in which there was a value engineering study done on a black box for the aircraft industry. The basic objective was to reduce weight. It was a cost-plus contract, so the fact of profits was set aside. In other words, the task made to the VE group was to reduce the weight and leave the costs alone because they were on a cost-plus contract.

Well, the VE group sat down and reduced the weight of the product, but also reduced the cost. The president or manager of the company called the value engineering and said, "Look, I told you to reduce the weight. You just cost us \$30 million in profits. By the way, we need more weight. Go back again, create another team, get some viewpoints, and reduce the weight again."

He did this. What happened again? VE eliminates secondary requirements, combine functions, simplifies. What happens to costs? Invariably the costs go down.

The second time around, he met weight requirements and also reduced costs again. The manager called him in and said, "Come to my office." My poor friend said, "I am going to get fired. I am going to pack my things." He gets up to that manager's office; that manager puts his arm around him and takes him out to the balcony. He said, "I'm going to get thrown off." He says, "Carlos, you see this parking lot? Choose your own parking space."

Now, those of you in government know that your parking space is your position. He said, "What happened? We finally can compete with the Japanese."

With that, I would like to thank you very much.

Senator LEVIN. Don't move yet because we have some questions for you.

Thank you very much, Mr. Dell'Isola. Your testimony here is particularly striking. All your testimony is, but I was really hit hard by this: "It's much harder to save money than spend money." There is a lot of truth in that as well as your other testimony.

Let me ask you a number of questions. You have been associated now with this issue for how many decades?

Mr. DELL'ISOLA. Thirty-five years.

Senator LEVIN. Three and a half decades. Even before value engineering, that is three and a half decades, right?

What are the major inhibitions?

Mr. DELL'ISOLA. The human factors that I cited at the very end. It is habits and attitudes.

Senator LEVIN. We have tremendous budget constraints now, for instance. Indeed we have had, at least in the domestic side of our budget—not so much in the defense side perhaps in the last few years—but on the domestic side we have had just a real crunch in a lot of areas.

We have smart people over in the OMB, not just the ones who are here with us this morning to hear my voice, but folks who are not here. They know they have to make dollars go farther. What is the impediment? Just what is it? Is it inertia? But that doesn't quite answer it.

Is it that we have to make an investment in order to save? Is that the problem—that we don't have the up-front dollars or it requires yanking some bucks away in the short term in order to save money in the long term?

Where are the real impediments, besides just human nature?

Mr. DELL'ISOLA. If you look at what makes a successful program—executive involvement, substantive investment, and organized effort—therein lies your key. The executive gets up there and says, "I want to save money." That is a wishy-washy statement. He has to isolate it, develop a management plan, assign tasks, and demand results. Demand results.

Senator LEVIN. We have laid before government agencies the results of I don't know how many reports over the last 30 years. I have not gone through them. I think dozens, if not more reports of GAO, saying that there is tremendous savings. We have the experience demonstrating savings. We have executives who are not dumb. They are trying to make dollars go farther. They see ratios, 12:1, 20:1, 30:1. You are talking about 30:1, 100:1, 1000:1. Whatever it is, they know that their own colleagues are making real savings. They may not buy your 1000:1, but they can talk to EPA and EPA will tell them it is now 34:1. Every buck you invest in VE, you are going to save \$34.

They will talk to each other at a dinner, or at a meeting, or someplace.

Now, what is the impediment to that? I mean bells have got to go off in someone's head when they are told—

Mr. DELL'ISOLA. People have got to be forced to save money because it is an unpleasant task. It is like the Navy, when I was with the Navy in setting up the program with the Navy's Engineering Facilities Command. They said there is absolutely no potential because we do this as a matter of our job.



We went up to McNamara and McNamara said, "You will." Then the admiral says, "Well, if we have to, we will." And then all of a sudden now, you have a program that saves two or three hundred million a year, because he took his negative attitude and made a positive attitude. We have got to develop positive attitudes towards savings and we have got to demand results and then we have got to reward performance.

You notice when the general says something will happen, it usually happens. The Committee and the Congress have got to stop talking about it and legislate a program, a level of effort, and say this will happen now on purpose. We can't make it happen by accident anymore.

Senator LEVIN. Do you believe we should mandate VE in every contract over a certain dollar threshold?

Mr. DELL'ISOLA. I think it has to be done on a discrete basis and a study. You just can't say that.

Senator LEVIN. Your point one was make it mandatory. How would you make it mandatory?

Mr. DELL'ISOLA. Make it mandatory that the first exercise should occur as a study of their program, and then a management plan be submitted to the legislature on how they propose to implement and organize the program in this direction, and then you and your committee will approve or reject, or sit with them in developing a formal program.

Once that formal program gets developed and reviewed, then it can be overseen by this fiscal responsibility area. In other words, you have to give them the opportunity to participate also in the development.

Senator LEVIN. If you were working with them in developing such a program to make it mandatory, how would you make it mandatory?

Mr. DELL'ISOLA. I would look at the large expenditures. I would look at the areas, and then say you will conduct VE studies or you will conduct these overviews or second looks on critical expenditures. Your level of effort should be between one-tenth to three-tenths of your overall budget, and you will develop an organized program suitable to this committee to see that it happens.

For example, Super Fund. We did a study on Super Fund and we set a threshold of \$4 million because basically 80 percent of their expenditures were in the range of projects over that size.

Senator LEVIN. So if you were recommending, now, some legislation or an administrative program, you would say there ought to be a dollar threshold above it; there ought to be a plan to do VE on every program above that threshold to set aside three tenths of 1 percent, or whatever that percentage is, to accomplish that purpose, but you make it mandatory above a threshold?

Mr. DELL'ISOLA. Right. What I am saying is that with each agency, the threshold will change because what you are looking for is to grab 80 percent of the expenditures, rather than the last small 20 percent, which may be a multitude of small projects.

Senator LEVIN. Putting aside where the threshold is, you would make it mandatory above the threshold?

Mr. DELL'ISOLA. Yes. Now, you can set that threshold high initially and ratchet it down to get them started, but get them started. The key is to get them started to see their results.

Senator LEVIN. Do you believe that VE is better performed by the contractor or by the agency?

Mr. DELL'ISOLA. The fact that it is performed is really what is important.

Senator LEVIN. It doesn't make any difference?

Mr. DELL'ISOLA. I don't think it makes that much difference. It's the fact that it has to be an organization that reports to the Executive, that it is not thrashed down to a point where it can't move horizontally and vertically. It has to have horizontal-vertical movement, so if it is organized as a separate entity, reports to a responsive person, it will work within the agency or by contract.

Senator LEVIN. Are there some types of contracts for which VE is not appropriate?

Mr. DELL'ISOLA. Yes. The black box approach; something that is black-boxed. We have trouble, for example, with high security areas, too. If the security is so intense that it takes you 2 years to get clearance and the project has to go out in 1 year, then it is not worth it.

And areas where they black-box a lot of things, like in nuclear reactors where they say, well, you can't touch the nuclear reactor portion. Now, there is plenty of opportunity outside, but when they black-box something, and by that I mean they say, here are the constraints, then it is not worthwhile. There are other areas of greater opportunity.

Senator LEVIN. Other than that one area, would you say there are other types of contracts for which VE is not appropriate?

Mr. DELL'ISOLA. I think what you have to look at is to set up a rate of return that you are interested in. For example, in an agency say DOE, they should not be looking at spending money to save money unless the potential return is at least 20 or 30:1.

Senator LEVIN. How do you know that in advance?

Mr. DELL'ISOLA. By doing some study. You can't make decisions without looking at the expenditure and the type of expenditure. For example, there are been savings, if you can believe, on toilet paper procurement. How can you save money on toilet paper procurement? There have been significant savings on toilet paper procurement.

It has to be analyzed. Anything significant, for example, if you set a \$10 million threshold, any expenditure over \$10 million should be looked at positively and then, by exception, those procurements isolated that have no potential. For example, if you are replacing like kind, then there is no potential.

Senator LEVIN. What kind of incentives would you put in the law or regulation to get agencies interested? You have talked about making it mandatory. That is a stick. That is just a requirement. If we didn't go that far, what kind of incentives could you design to attract agencies to overcome the kind of inertia that seems to be a problem?

Mr. DELL'ISOLA. The one thing that I would suggest is allowing them to reprogram the savings within their own agencies so that

they can see the results of the savings in increased effectiveness in their area.

For example, in Saudi Arabia what we are doing is we are allowing the program managers to reprogram savings—for example, we did a study on a \$200 million facility. The director had projects he wanted in the waiting list—in other words, they have projects they don't have funds for—there was one project he particularly wanted to realize which was \$25 million. So we saved enough in the large project that he funded, then, the \$25 million projects he wanted.

If you said any savings has to go back to Congress for reprogramming, then you have a negative incentive. If you said, they will have the flexibility of then funding either critical maintenance items or postponed maintenance items they think are critical or projects they feel critical, then you will have their attention.

Senator LEVIN. How about with contractors? What kind of incentives do you think we have to give contractors to get them more involved with VE?

Mr. DELL'ISOLA. Contractors are a funny breed. Money is usually their prime motivation.

Senator LEVIN. So a larger share of the savings?

Mr. DELL'ISOLA. A share in the savings and a simplification. Most of the contractors I talked to, when I am talking to them, they are skeptical that the government really means what they say. And I think it needs an awareness. The sharings, I think, that are presently in vogue—a 50/50 split—I think are adequate. It is just that the contractors don't feel comfortable. They don't feel that they should waste any money because they don't believe they are going to get a fair shake.

If they see an active program in house, I think their participation will increase.

Senator LEVIN. I want to just ask about up-front costs. Now, there are two kinds of up-front costs as I am using the term. One is the cost to do the VE itself. You call those up-front VE costs. And then there is the up-front implementation cost. I don't know if that is your lingo or not.

Mr. DELL'ISOLA. I understand it.

Senator LEVIN. Is it the lack of funds for up-front VE work in addition to the performance of VE by contract?

Mr. DELL'ISOLA. Yes, because what happens is, if there is a large saving, the implementation cost can be significantly more than the VE effort. We are doing a project in Saudi Arabia now on a \$200 million project where we have isolated \$50 million in savings. The VE effort was \$150,000. The redesign is going to be a half a million dollars.

Now, if there is not access to that half a million dollar redesign funds, the whole savings will go down the drain.

Senator LEVIN. I was talking about the study. I was talking about the up-front VE costs, not the implementation.

Mr. DELL'ISOLA. That usually can be fairly identified.

Senator LEVIN. That is not the big problem?

Mr. DELL'ISOLA. That is not the big problem. But the implementation costs, the up-front implementation costs can frequently be a problem.

And have been problems. In other words, we have lost a lot of savings because there was not the ability to appropriate the kinds of implementation costs that were needed. Therefore, the savings were lost.

Senator LEVIN. Is there any difference in terms of the contractors or the government putting up those costs as to the likelihood of funds being available?

Mr. DELL'ISOLA. It is a problem. You have hit on probably the most significant impediment to good VE. By good VE, I mean total cost VE. The budget process where you have capital appropriations and then you have O&M appropriations.

So if you save significant money up front on O&M, there is no way you can transfer the O&M savings up to the capital costs. So that is why I said there has to be a special fund or a revolving fund established so that those costs are available. You can do a study up front and say, I am going to reduce the O&M by 50 percent, but I have to increase the initial cost by 10 percent, and there is no way you can implement it because of the funding process. O&M is one budget and the capital appropriation is another.

That is why I say there should be somebody up above, fiscally responsible, that can make that transfer.

Senator LEVIN. Mr. Dell'Isola, we thank you again for your testimony. It was most helpful. Keep your spirit going another 3½ decades.

Mr. DELL'ISOLA. They say that, if nothing else, my enthusiasm is contagious.

Senator LEVIN. Very helpful, indeed.

Our next witness is John Mittino, who is the Deputy Assistant Secretary of Defense for Production Support, and I understand he is accompanied by Gordon Frank, who is the Director of Industrial Productivity of the Industrial Productivity Support Office at the DOD.

Mr. Mittino, Mr. Frank, we welcome you. We are grateful for your appearance and we will also put your prepared testimony in the record. If you will summarize it, we would appreciate it.

**TESTIMONY OF JOHN A. MITTINO, DEPUTY ASSISTANT SECRETARY OF DEFENSE FOR PRODUCTION SUPPORT,<sup>3</sup> ACCOMPANIED BY GORDON A. FRANK, DIRECTOR, INDUSTRIAL PRODUCTIVITY SUPPORT OFFICE, DEPARTMENT OF DEFENSE**

Mr. MITTINO. Mr. Chairman, thank you very much for this opportunity to let us describe our efforts in value engineering in the DOD. We, as has already been partially indicated, have an extensive effort in the Department of Defense, and we see significant benefits coming out of that program.

The DOD program, incidentally, was started in 1962 and in 1981 we had a major revitalization of the program. We are now seeing the benefits of that revitalization. The trends are generally up as a result of our 1981 revitalization of that program.

The purpose, of course, has been amply stated, I believe, and I won't review that, but we do have the programs segregated into, for management administrative purposes, two parts; one is what we call an in-house portion of the program, and we have a portion

<sup>3</sup> See p. 68 for Mr. Mittino's prepared statement.



of the program where the work is done by the contractor base itself.

We feel that VE is a major tool and that it works in conjunction with many other acquisitions initiatives that I would like to describe in just a moment.

As just a major recap, our in-house activity—this is the VE that is done in depots, arsenals, air rework stations, in-house industrial activities of other sorts—from 1980 to 1986, all the trends are up as far as VE savings, with the exception of one year, 1984.

In 1986—that is the last year for which we have fairly consistent data that has been reported—we have had 7,000 value engineering proposals for an estimated savings of over \$1 billion. I think that figure is included in your figure that you used at the outset of this hearing.

The contractor savings, as we looked at it from 1980 to 1986, are generally less, absolutely, but the savings have quadrupled. So, relatively speaking, the savings are on the upswing and the trend is up, as I indicated.

For example, in Fiscal Year 1985, we realized \$340 million in savings as a result of contractor efforts and \$453 million for 1986. Incidentally, those savings were the result of 900 value engineering change proposals, which is the vehicle used by a contractor to engage in the program.

We have a goal that was established six or seven years ago at seven tenths of 1 percent of our total procurement total obligation authority; our budget authority, that is. And we look at that goal as fairly meaningful because it is something we are striving to reach.

In 1985, we reached 45 percent of the goal and in Fiscal Year 1986 we reached 61 percent. So, as a goal, we feel that it is reasonable, that it is something that we are trying to attain, and we still have a way to go.

Now, to just describe to you very briefly some of the improvement—we think we have a pretty good program—but even so, we are on the upswing. We still continue to work on the program. We have a lot of education underway regarding the program. We have additional management support. And I would like to explain what some of these actions are.

Most recently, Secretary Taft, our Deputy Secretary, directed more and additional use of the value engineering clauses in our contracts. An illustration of that is in Fiscal Year 1986. The Army, for one-half of the Army's major programs, had a discernable significant value engineering action involved.

Another action has to do with the encouragement for use of this program and in the development phase of our acquisitions program. There is a lot of leverage at that phase, and we are now working on that fairly diligently to get people to understand what that leverage is. And that is very useful.

We are also currently working on a plan to better involve our subcontractors. The incentives are not all they should be. We are working on the incentives which have to do with the relationships between the subcontractor and his major prime, and the relationships among the government, the major prime, and his subcontractor.



tor. So we are working this in a business sense in connection with incentives.

We are also developing additional budget guidance to promote the value engineering program. For example, we will specify that the reserves involved in programs for engineering changes are also made available for the value engineering effort.

We are also increasing training. All of the services—Army, Navy, Air Force, and even our Defense Systems Management College at Fort Belvoir—are involved in this training. It has various forms such as contract training, business training, and technical training. In Fiscal Year 1986, 7,000 people in the Department of Defense were exposed to value engineering training in some way, shape, or form, either an extensive course or familiarization through a management course.

The VE data base is a new entity. It has to do with tracking where we are. It gives us another management tool but, most importantly, it provides us a way to make visible the benefits and results of our VE efforts. Now we have in place a program to record, in a data base, the value engineering results for use by the world at large so that we can get the leverage of the work that is done in that program.

As incentives, in addition to the normal incentives that were available historically, such as bonuses and merit promotions, et cetera, we have added specifically for the VE program, a series of honorary awards. We have six categories: awards to installations in house; awards to best contractors involved in VE; individual professionals; individual government employees, and so forth. As a matter of fact, this is an annual award basis and we bring in the big guns, such as or the Deputy Secretary, who have made these awards personally and put that program on the map.

It is very important for me to include now in my statement that the value engineering program is considered to be a very significant tool; but, it is not a panacea. We work this program in concert with and in conjunction with many other programs. I will tell you what these are and give you a sample of what they are; the point being that the activities involved in these other programs philosophically look very much like the value engineering procedure.

They all have to do with reducing costs, raising productivity, and they all have tried to include proper incentives for doing this. As just a quick example, and we can pursue this later at your pleasure, we have a major program called "Acquisition Streamlining" that has to do with scrubbing down initial requirements right at the outset, reviewing these with hard-nosed murder boards to really bring down to the minimum necessary that we are buying as far as hardware, data, and software.

We have a Reverse Engineering program which seeks to look at spares where only a single source exists, back into there, reverse engineer, develop a technical data package, and put these out for competitive procurement.

Manufacturing technology is another program we have for increasing the productivity on the manufacturing floor. So, you see, in a way all of these have to do with the same kind of objective and the same end result.

And you are familiar with one of the programs because you very kindly acted as our sponsor for it, and that is the Standard Military Drawing Program—it may sound familiar to you—for electronic parts and semiconductors, and that program is on the way. It is working right now and it is also giving us a better way to record, for contractors to order and purchase the myriad of electronic parts that we use.

I have described very briefly our program. We see thousands of proposals every year. Participation is very broad. The program is on the upswing. We have been able to move this program, maybe slowly, but consistently in the right direction. We have incentives involved. We provide the environment, the training, the encouragement, and the commitment by high-level DOD executives, and the interest. And we hope to continue to do this.

Our in-house program is on track and we are working very hard to bring a better performance with the contractor program. We would be happy at this time to answer your questions, Mr. Chairman.

Senator LEVIN. Mr. Mittino, thank you very much for your testimony. We appreciate it. We also recognize that there has been progress in the Department of Defense's efforts in this area and we appreciate that as well.

The questions that I have about why not more should not be in any way construed to detract from the fact that the DOD is one department which has at least done some VE and is working on it. There are some agencies that ignore it altogether. That is not the case in the DOD, as you well know and as we well know.

In December of 1984, the DOD IG reported that value engineering studies were not made on about 80 percent of Army and Navy construction projects, as they were being designed, and on 95 percent of Air Force projects. I am wondering what the DOD response has been to that IG audit.

Mr. MITTINO. There are IG reports and GAO reports on this subject, three of them relatively recently. In every case, we track these numbers and include them in our tallies for the year as far as performance. We make several responses to these. We provide more encouragement, if necessary and additional direction. More recently, Deputy Secretary Taft did so in a general way by specifying that all major programs would have a value engineering contract clause, and that is the way we do it.

We, in general, amalgamate these results and then try to work out the deficiencies that we find in these audits.

Senator LEVIN. What would be your estimate for those percentages, say in 1986? The 1984 DOD IG said that 80 percent of Army and Navy construction projects were not value-engineered. Eighty percent.

Do you think that would be about the same percent in 1986, or would there be improvement, would you guess, after that? Or don't you know?

Mr. MITTINO. Mr. Chairman, I really don't know, unless Mr. Frank knows that.

Senator LEVIN. You don't know on those same types of construction projects, what that percentage would be today?

Mr. MITTINO. I don't know, sir. We would be glad to get this for you and include that for the record.

[The information referred to follows:]

The Army reports that value engineering was conducted on 74 percent of all military construction contracts of \$2 million or more. The Navy reported approximately 75 percent of military construction projects over \$2 million, representing about 80 percent of the Navy's military construction dollars, were similarly value engineered. Air Force construction contracts are awarded by the other services; there is no separate accounting for Air Force construction contracts.

Senator LEVIN. Does the Taft directive include construction projects, do you know?

Mr. MITTINO. It specifies major programs as such. If I could ask Mr. Gordon to detail that, just very quickly, what that involves.

Mr. GORDON. The major programs are seen in light of the weapons systems programs, and we define major programs as those that will see an expenditure of \$200 million somewhere in the development phase and a billion dollars more in production.

Military construction, as you know, is a separate budgetary element, and I don't believe that the military construction would be included in that particular, nor do I feel that there are many military construction items that would approach those kinds of numbers and be seen as a major program.

Senator LEVIN. Why don't we apply VE to large military construction projects. What is the impediment? I kind of feel like this is something which should not have to be imposed or mandated. It ought to be just obvious to most people. Apparently the results are good.

I am not a technician and I am not an expert, but from what we read from your agency, from other agencies that have done it and used this method, it apparently is helpful. It is an approach that saves money, and I am just trying to understand why the inertia? Why would it not be automatically done in a large military construction project without somebody having to remind anybody or ask anybody or mandate it?

Mr. MITTINO. My impression is, subject to correction from the program manager, that that situation has improved.

Senator LEVIN. Let's assume it has improved. It seems to me there is resistance. Is it human nature? Is it inertia? Is it momentum? Is it the factors of up-front costs? Is it the fact that nobody wants to save money because if you are under budget, then it means that you never needed the money to begin with, and you are going to lose it? What is it?

Understand, I am not trying to brow-beat anybody into accepting a program that doesn't make sense. I want to know why this thing doesn't just sort of flower on its own. Why do we have to mandate it continually from above and kind of prod executives into doing it?

Mr. MITTINO. Mr. Chairman, part of your comments suggest why do we have to mandate it, and I suggest that we don't. If we are on a continuous upward rise, these things, we submit, don't happen overnight.

Senator LEVIN. You have to mandate it. Taft has to enter an order. I am not talking necessarily legislative mandating. Taft has to enter a directive telling people we want this done more often. It doesn't include construction. So I say well, why not major construc-

tion projects? And I presume the answer would be, maybe it should be; we will go back and look at it.

That would be a fair response and we would welcome that. But why isn't this just grabbed by COs and people who are implementing projects? Is it because they are afraid to save money? Is it really harder to save money than it is to spend it? Is Mr. Dell'Isola right?

I am not picking on Defense, but again your record is a lot better than a lot of agencies. I am just saying give us some insight.

Mr. MITTINO. I will try to do this. I happened to mention some of these other programs, and I would venture to say that our commanders are executives, and this is a large and complex organization, as you know. They see that they are doing these kinds of things with either VE or with other programs.

I see a lot of movement in some of these other efforts that we have to reduce costs and raise productivity; it is there. It may be that an executive looks at his problem, his investment opportunities and responsibilities, and he gets the best mix he can of how he can save some dollars. If he can do this by streamlining, if he can do this by manufacturing technology, he will do so.

As a matter of fact, I would dare say that if we were able to tally the money benefits of all of these programs, not just VE, that the dollar figures would look very, very good indeed.

Senator LEVIN. I am not talking about all those other things that are being done at the same time. I am just really focusing on VE.

Mr. MITTINO. I understand that, sir.

Senator LEVIN. I am trying to identify what that block is. There are some blocks out there. Either that, or it is not as good as it is cracked up to be, which if somebody wants to tell me, that is fine, too. But if it is as good as it is cracked up to be, if there are real savings—and that is what people tell us who use it, and I have got to go by that—I mean I just do not have any basis to say it is not useful. I am willing to hear it; I am open to it; but I just do not find that there is any such belief out there.

Mr. FRANK. If I may, sir. Number one, I think it is useful. I think the savings are real. But I think that given the pressures that a program manager has to deal with in terms of a requirement perhaps for performance or for schedule, we are developing a weapons system in opposition to a threat that we perceive or to a technological opportunity that is only available to us for a short period of time, until perhaps the other fellow catches up.

Senator LEVIN. Until what?

Mr. FRANK. Until the other fellow catches up. These things sometimes—it becomes the responsibility of the program manager to balance many competing pressures, among them costs.

So what we are trying to do is educate those people to the importance of costs, and not necessarily to do value engineering for the sake of doing value engineering, but to do value engineering for the sake of the benefits that flow from it, one of which is usually lower cost, but along with lower cost, as Mr. Dell'Isola has pointed out, we generally see improved reliability, simplification, many other benefits that are of use to the program manager.

Senator LEVIN. Why not mandate VE unless the program manager makes a note in the file that he is not going to use it and says



why, to try to get people thinking this, say you have got to do it unless you note in the file why you are not doing it. A real easy escape clause.

Mr. MITTINO. Mr. Chairman, your comments before, you mentioned the name F. Pyatt. I am acquainted with the gentleman. The answer to your question lies in what is happening right there.

There is a level of management in the Department of Defense having to do with the Assistant Secretary level, the acquisition management people, the personalities themselves, the commanders of the Military Logistics Commands. When these people believe a program is important and when they say it shall be done, it gets done. And this is what we are able to achieve now.

Senator LEVIN. If it is good for the Navy, why don't we force it on the Corps of Engineers?

Mr. MITTINO. That is probably possible.

Senator LEVIN. But why don't we do it? Let me just give you one fact. There is an IG report in 1984 on construction by the Corps of Engineers which, by the way, is its own customer in civil projects. The Corps of Engineers performs VE on only a few projects and does not accept its own VE suggestions if it has adequate funds to proceed without making the changes.

Now, that is what the IG says. That is not us saying it, but the IG says it. How do we explain that? Why should we just tell the Corps, you have got to do it; Pyatt is doing it in the Navy. Or you have got to give us in your file, just write an explanation, a paragraph, on any construction project where you are not doing VE, as to why.

What would be the harm of doing that to the Corps.

Mr. MITTINO. It certainly could be done, sir.

Senator LEVIN. Just honest, straightforward explanations. I am not looking for some devil theory here. I don't think there is. I think there is human nature going on here, and I would like to understand what it is and see if we can't trot it along if we have to, and not make more mistakes, not create a cure that is worse than the disease in the process.

We do a lot of that around here. I am sure I have shared in some of that medical practice myself, where we see a problem and try to design an answer for it which sometimes creates other problems.

We don't want to do that, but on the other hand I see resistance. Before we create any kind of response to the problem, I think we ought to understand as much as we can why the inertia.

Mr. MITTINO. When the benefits are visible, people begin to believe and people operate along those lines. We are now, with this data base, starting to make these benefits visible. I really believe that is an important part of this. And we are on that track now.

Senator LEVIN. What specific actions has the DOD taken to educate the contracting officers as to the merits of VE?

Mr. MITTINO. That is involved in our training program. I will ask Mr. Frank to describe that to you.

Mr. FRANK. We have a course, "Contractual Aspects of Value Engineering," that is tied into the Air Force Institute of Technology at Wright Patterson Air Force Base. The Navy has also instituted a combination 20-hour course, the "Principles and Applications and the Contractual Aspects, and they give that course several score



times a year, particularly in the headquarters area at Crystal City, and have educated several hundred of the middle management, both engineering management and contracts people in the value engineering area, and we see that program as growing and paying dividends in the understanding that these people have of the program, and they are willing to participate and willing to support it.

If they don't know, if they misunderstand, then there is an absence of support. And once they are educated and understand the purpose and understand their role in it, then they begin to support the program and it reflects in the statistics.

Senator LEVIN. Would you, for the record, let us know approximately what percentage of COs in each of the services are exposed to that kind of training?

Mr. MITTINO. We would be very happy to.

Senator LEVIN. Just give us an estimate. Ten percent, 50, whatever the percentage.

Mr. MITTINO. We will provide it for the record.

[The information referred to follows:]

The Army reports that they do not currently track the percent of contracting officers that have had value engineering training; the information is not available. However, Army records do indicate that 222 contract specialists received training in the 40-hour contractual aspects of value engineering course in FY 1986. The Navy reported that during the period from fiscal year 1984 to fiscal year 1987, 228 people, approximately 27 percent of Navy contracts personnel, attended the two and one-half day course in Navy Value Engineering (VE) Applications and Contractual Implementations. The Air Force reports that 388 contracting officers or 14 percent have been trained in value engineering. The Defense Logistics Agency also reported that during the last five years 76 percent of their contracting officers have received a VE orientation.

Senator LEVIN. It may be over time, it may be a certain percentage per year, but give us the estimate.

Would you submit to us also the training materials that are used in those courses? You have one in the Air Force, one in the Navy. I gather there is no such course in the Army?

Senator MITTINO. There is. All the services have a unique approach to doing that.

Senator LEVIN. If they are too voluminous, just then kind of describe what they are. If they are literally thousands of pages, which I doubt, give us the description and where we can locate them.

Mr. MITTINO. There is a handbook that is used in each course.

Senator LEVIN. That would be great.

[The information referred to follows:]

Under separate cover, the Subcommittee was provided a copy of the US Army Corps of Engineers, Value Engineering Officer's Operational Guide, EP11-1-3, dated January 1987; the US Army Corps of Engineers Value Engineering Workshop Handbook, CON #110, dated FY 1987; and the Navy Value Engineering (VE) Applications and Contractual Implementations Handbook, dated January 1987. A copy of the training materials used in each value engineering course offered by the Air Force is enclosed. Material used by the Defense Logistics Agency for VE training was also provided to the Subcommittee. Additional training material will be furnished to the Subcommittee as it is received from the military services.<sup>4</sup>

Senator LEVIN. Is there any distrust between some DOD contractors and the DOD about these proposed changes that would result from value engineering? Apparently a number of contractors at

<sup>4</sup> The material referred to above is retained in Subcommittee files.

least just don't submit the proposals because they are not confident that DOD would really welcome them? There is time involved; there is wrangling involved over actual savings, and the shared savings—how that would be distributed and so forth. Would you describe that, just how extensive it is?

Mr. MITTINO. Yes, very briefly. And I will add one to your list. It takes too long to process the proposal, et cetera. All these reasons come into play. They are different for different contractors.

I have heard contractors in their attitudes range—and I have heard this personally—anywhere from they don't want to hear about VE, all the way through it's the greatest thing since sliced bread.

This is part of our education process and, more importantly, we try to make evident to them that our high-level management believes in the program and is supporting it.

Senator LEVIN. Why is there delay in processing these proposals? Is that normal? Red tape and paperwork?

Mr. MITTINO. Certainly some of it must be. We are part of the government here. But some of these proposals are highly complex and highly technical proposals and they require engineering analysis; they require substantial time if it involves, let's say, a major test range that has to be scheduled near the West Coast. So there are good reasons why these things take so long, Mr. Chairman.

Senator LEVIN. We again are grateful to both of you for coming today.

Mr. MITTINO. Thank you, sir.

Senator LEVIN. Finally, we will call upon the Administrator of the Office of Federal Procurement Policy, Bob Bedell, an old friend of ours. We welcome you back.

Bob, we are delighted to have you, and perhaps you could introduce your cohort here.

**TESTIMONY OF ROBERT P. BEDELL, ADMINISTRATOR, OFFICE OF FEDERAL PROCUREMENT POLICY, ACCOMPANIED BY DR. ALLAN BURMAN, DEPUTY ADMINISTRATOR**

Mr. BEDELL. This is Dr. Allan Burman, who is my new Deputy at OFPP. Al joined me from the budget side of the Office of Management and Budget. He was in charge of the Air Force's budget for several years and is a valuable addition to OFPP.

It is a pleasure to be back up here and to be testifying in front of you now in yet a different capacity. I didn't suspect six months ago I would be here talking about value engineering, but here I am.

Senator LEVIN. I wasn't sure six months ago I would be here in this capacity either. [Laughter.]

Mr. BEDELL. I assume that my prepared remarks were introduced into the record.<sup>5</sup>

Senator LEVIN. They will be, like all the other remarks.

Mr. BEDELL. I would just like to make a couple of comments and then maybe address some of the views that I have heard this morning.

<sup>5</sup> See p. 80.

First of all, value engineering is a time-tested and demonstrated cost-cutter in appropriate circumstances. I can remember about 15 years ago now, that I was trying some cases related to value engineering and this was my first exposure to it. I can remember talking to many of the technicians who truly believed that there was a lot of money to be saved in the value engineering field.

My review of what has happened in value engineering in preparation for this morning's testimony indicates or reinforces again that it is a valuable tool.

As John Mittino indicated, it is one of many tools that the government is using to try to cut costs in government procurement, to try to simplify the process, to try to simplify the regulations, to try to simplify the specifications to which government-required products must be made.

I have listed some of those efforts on pages 3 and 4 of my prepared remarks and I will not repeat them here. I think there has been a pretty good overview of the extent of the government's value engineering effort. I had some figures that frankly we culled from the responses to the letter that you sent out in preparation for this hearing. For in-house value engineering savings for 1986—and these are real rough numbers—but they are somewhere in the order of \$2 billion that in 1986 was saved by the value engineering efforts of in-house reviewers of government projects.

The value engineering change proposals from contractors were about \$450 million and the total was about \$2½ billion in savings. That came from about 5,000 value engineering proposals from within house, and about 900 from contractors. Again, the total was about \$2½ billion.

The rate of return ranges, depended upon the circumstance, the contract, and the program, but many of the returns are quite extraordinary and very encouraging for further improvements in the use of the value engineering concepts.

Senator LEVIN. Let me just interrupt you there. Are those proposal figures which you gave us, the 900 for the contractor proposals and the 5,000 for the in-house proposals, are those the ones which were implemented or are the ones which were proposed?

Mr. BEDELL. Those are the ones which were approved.

Senator LEVIN. Do we know what percentage were disapproved?

Mr. BEDELL. My understanding is for the contractor-proposed changes, that 45 to 50 percent of those that were submitted were approved; is that right Al?

Dr. BURMAN. That is right.

Mr. BEDELL. Forty-five to 50 percent. I don't know how many were proposed from within house.

Dr. BURMAN. I don't have that figure either.

Senator LEVIN. That is helpful; thank you.

Mr. BEDELL. Now, most of the savings and most of the activity, frankly, occurred within the Department of Defense. Much of what has occurred in savings has also occurred under construction contracts as well, so much of the activity has been DOD-oriented and much of it has been in the construction contract area.

You have been asking, well, gee, we are all interested in saving money, so why doesn't everybody at every level want to save money? And that is a very good question and one I have been in-

terested in the answers to from the real experts who are there dealing with these programs every day.

I can speculate as well as to what some of the reasons might be that it is not used more, and they are somewhat consistent with what I have heard this morning. I think it is largely motivational and human attitude that is the cause for it not being used—value engineering concepts not being used more than they are today.

There are a lot of demands put on contracting officers and contracting personnel. Many times the pressure to get a procurement done in a timely fashion is, frankly, more important than saving money in the process of doing it, especially if the timeliness of contract performance could be jeopardized by consideration of value engineering proposals or for the introduction of value engineering proposals. I suspect that—but would defer to the folks with the factual information—that many times it is the pressure to get the job done in a timely fashion that is more important than seeing if they can save some dollars.

Again, dealing with incentives, where is the incentive for the contracting officer to want to encourage the contractor to submit value engineering change proposals? He has got to process the paperwork. It eats up 78 to 82 days, on average, of his or her time in order to process them. Where is the incentive for the contracting officer to be told when to put those clauses in, to be told when to require that value engineering be done as a part of the contract? But it could be helpful if we could identify that which would provide a greater incentive for contracting officers to encourage the submission of value engineering change proposals.

Mr. Mittino indicated that they have award programs and recognition programs, and they have high-level support for it in the Department of Defense, which I think accounts for their exemplary record compared to the other departments and agencies, but it would be helpful if we could identify additional incentives for the contracting personnel to use and encourage contractors.

On the other hand, there were only 900-some-odd value engineering change proposals accepted, and if that is half the number proposed, then there were less than 2,000 proposed in 1986. Why is that the case, if in every contract over \$100,000, with some exceptions, there is an incentive clause which provides that they can share in savings? Why were only 2,000 submitted? That is a good question.

I don't know the answer to it, but I could speculate that part of it deals with the incentives of the senior personnel in the companies. They say, look, if we invest our resources in other areas, we are going to get a greater return on that investment than if we invest those expenses in trying to improve the government's own specifications here. And they may look at the other side of the table and say, do we really want to tell him—him, the government technical person—that we think that we can redesign his product for him and confront him with a better mousetrap, or do we want to sink our resources elsewhere?

Besides, if only half of these value engineering change proposals are accepted, that means that half of them are not, and the costs associated with those that are not accepted are not now—it is my



understanding—allowable costs. They are not paid for by the government in any fashion.

There is a case under development in the DAR Council right now which would consider making those costs allowable costs. We will watch to see the resolution of that. But it is not a sure thing that an investment in value engineering by a contractor is going to result in rewards.

So a great deal of it is the attitude of the senior people in these companies to encourage that kind of expenditure. In many instances, I suspect, they believe that they can get greater returns, more certain returns in other areas. And it takes time and it takes paperwork, and whenever you are trying to get something through the government, the amount of paperwork that seems to be required is only a part of what actually is required, because the government can always ask for more before it passes on a benefit. From my experience, it always seems to require more than is apparent as a requirement. It takes a long time, it takes a lot of paperwork, and there may be higher benefits elsewhere.

The incentives on the part of the government to use value engineering at the lowest level where it is actually applied is very difficult. I would be interested in any thoughts that the committee has. I was informed by what I heard so far this morning, but I think we need to establish greater incentives, both for the contractors to participate in the program and to seek those incentives. Maybe we should increase the percentages of the incentives that they do get right now. The incentives often are about the same as for other incentives in the contract.

If you reduce the cost of performing a contract, and you are going to be compensated for that in some other fashion under the contract, you can do that and avoid all of the paperwork and all of the processing of the value engineering change proposal. So we need to look, I think, also to see if part of the reason that value engineering is not being used as much as it is by the contractors is because they can do the same thing and get compensated for it by other incentives that are in these contracts now, so there is no advantage in their proceeding under the value engineering change proposals in order to get compensated for their better ideas.

I don't know the extent to which that is the case, but if you look at Part 48 of the FAR, it sets up the value engineering change proposal percentages when they are approved, to be roughly that of several of the other incentives provided for contracts.

So it may be that the question, why aren't they doing it more, is answered "because they are doing it in a different way." They are getting compensated for their better ideas in a different way. But I don't know whether that is the case. Theoretically, I think it may well be, but I do not know the extent to which that is occurring. But I, like you, am in search of information to make a better policy here.

I am interested in seeing if we can't do that. There are a number of authorities that we would have, should there be a better policy, to implement it. We do have some leverage over the regulatory development process here, and we would be amenable to doing that if we can agree on a better policy.



Second, we have the authority to issue policy guidance to departments and agencies. Once again, if we have anything useful to say to them, I have nothing against doing that at all. If it is nothing more than saying "This works well for the Department of Defense and could even work better for other agencies; why don't you do it as appropriate?" we can do that as well.

I think there are a number of ways if we can figure out the best policy here to go about seeking to implement it.

Senator LEVIN. Thank you very much, Mr. Bedell.

I made reference before to the Corps of Engineers, just to pick one example, that IG report of 1984 which says that they don't even accept their own VE suggestions if the funds are available in a project and they rarely do any VE.

Why? OMB knows about that and I presume knew about it back then. Somebody knows about it. You folks are as much interested in saving money as anybody, I think probably more than anybody in the government.

Why doesn't that just set off alarm bells over in OMB, that kind of an IG report? Maybe it did. Maybe somebody called in. I mean you are in the White House. Maybe somebody called in, the person who runs the Corps, and said, "What in God's name is going on here? You people don't use a proven cost-cutting technique very often, and when you do use it, you ignore its recommendation."

Did those alarm bells go off? You probably will not remember a particular example, but what is your guess? Would those bells have rung? What would have happened?

Mr. BEDELL. I don't know what happened. I had not heard of the IG report until this morning when I heard you cite those figures. I have the same reaction to them as you do. It seems to me, just knowing what I have heard, that that is ridiculous, and that that ought not be their policy, and we ought to find out whether it is.

I don't know what alarm bells went off, but with a statement like that they should have gone off.

We have a new Associate Director coming to OMB on the budget side who is going to be the principal Associate Director for Natural Resources, Energy and Science, whose name is Bob Dawson, who was formerly the Assistant Secretary of the Army in charge of Water Programs, including the Corps of Engineers.

Senator LEVIN. I remember his confirmation vote.

Mr. BEDELL. Well, he is now joining us at OMB and I am pleased with that. But he is also a knowledgeable source on the Corps activities. I think he may start next week, but I will make it a matter of first order to sit down with him and find out.

Senator LEVIN. I would be interested in that. Why don't you, for the record, just kind of go back into whoever would have taken this action at OMB if they had seen the report. Maybe they did see the report. Kind of tell us what happened. Was that report ever seen by OMB, just taking one example. What happened after it was seen? Did anyone in the Corps—someone is in charge of the Corps' budget at OMB—did that person see the report? Did that person call up the head of the Corps and say, what is going on? What was

the response from the Corps? Let's just track the process, not to kick anybody particularly, just to find out what happened.<sup>6</sup>

Senator LEVIN. By the way, that raises another question. Are IG reports routinely sent to OMB?

Mr. BEDELL. They are sent to the PCIE, aren't they?

Dr. BURMAN. Right. And we get IG reports that deal with the procurement area, and so we would generally get those kinds of reports.

Mr. BEDELL. We don't get all IG reports, but we get those that pertain to procurement and the other offices in OMB are supposed to get the IG's reports pertaining to them. The President's Council on Integrity and Efficiency, I believe it is, which is chaired by the Deputy Director of OMB, who gets, I think, or at least has access to all of them.

Senator LEVIN. I would hope so. In any event, let's try to track that one down and see if we can identify some of the impediments here that seem to exist.

You said in your statement that there is a FAR case that has the purpose of providing guidance to contracting officers with respect to when to use the clause which requires contractors to perform VE. Apparently that clause is not used very often.

I am wondering what kind of guidance is available now to COs to use that clause. Well, let me start with that. Do you know what existing guidance there is relative to that clause?

Mr. BEDELL. Part 48 of the FAR sets forth the circumstances and the guidance in that regard. And for the incentive program it applies to all contracts over \$100,000. But there are exceptions to that. Some of them appear to be rather large exceptions.

I don't know how often they are used, but apparently the agency head has the authority to decide simply that he is going to exempt his entire agency from a value engineering program. I have no idea how often that is used or if any agency has ever used it, or whether they have used it properly or not. And the incentive clause would apply to \$100,000.

Now, at the Department of Defense, Deputy Secretary Taft has issued some guidance which would require value engineering, as was described by the prior witnesses, in major acquisitions which are a billion dollars and \$200 million in R&D, so in those circumstances they are required. Now, I don't remember what the FAR said about required in the absence of specific items as came down from the Deputy Secretary.

Al, do you remember?

Dr. BURMAN. It's optional in that regard. The guidance from the Secretary on the major programs says to consider putting required clauses in other kind of contracts other than major acquisition contracts, but it is purely an optional thing to do.

Senator LEVIN. Shouldn't you be looking at how those clauses are being used and why they are not used as frequently as they should be?

Mr. BEDELL. Yes. I think so. And I think this hearing has been very useful in that regard in pointing out that somebody should.

<sup>6</sup> See p. 98.

Senator LEVIN. Would you take a look at designing a VE program in the OFPP?

Mr. BEDELL. Yes.

Senator LEVIN. I will tell you what we will do. We will match you. We will look at a legislative program which we will try to design in a semi-intelligent way, and carefully, and get your reaction to it. In other words, we will ship it over to you, but it could contain a number of points, I would think. It just struck me this morning.

At a minimum, I would think, on some types of programs, we ought to require an explanation by the CO as to when VE is not being used and why. It does not have to be elaborate; just to raise the sensitivity. Just identify thresholds and say, look, if you have a program more than this, construction or otherwise, weapon or whatever, if you are not going to VE it, given the track record of VE, just make a note in the file that you thought about it, you've considered it, you are not going to use it because of delay, or there is too big an up-front investment, or whatever the reason is you are not going to use it.

We also might want to look at something you talked about, which is trying to expedite that contractor's proposal. I think you used the figure 78; you said 78 to 84 days?

Mr. BEDELL. If I remember the averages—and I am not sure they were government-wide—they may have been only DOD. I will correct it for the record. But it was 78 days on average to approve a value engineering change proposal, and it was 80-some days that it took on average to disapprove.

Senator LEVIN. There may be something that we can do on that. As usual, we ought to be careful if we are going to proceed legislatively because we could end up micromanaging, creating costs, delays, red tape, paperwork. There are times it is appropriate. This may or may not be a time.

But what I would do, and with others who are interested in this subject on this subcommittee, would be to at least draft a proposal legislatively for you to critique, and I would like you to match us. If you come up with a VE program in the OFPP for us to critique—

Mr. BEDELL. What I will try to do is to set one up that works as much as possible on incentives on both sides of the contracting table. I am concerned about requiring another certification and another piece of paper by contracting officials. Sometimes I think that what they do all day is sign little pieces of paper and put them in a file for some poor auditor or litigant to stumble on in future years.

Instead, what we ought to be doing is figuring out how we can get them to do the right thing and to want to do the right thing, and that gets back to incentives. I think some of the prior witnesses are correct in how to provide incentives to contracting personnel; that is, you dangle some dollars out there and you will get some results.

But how you do it with the other side of the other contracting table is indeed a much different proposition.

Senator LEVIN. We may want to try some pilot stuff in terms of certification. I would not suggest an elaborate certification particu-

larly; just to make that CO out there think about the possibility, even if he just says I have thought about it and decided not to—check a box.

I agree with you; elaborate explanations are not what we are after here. Elaborate paperwork does get suffocating and we have imposed a lot of it, so we are sensitive to that in the procurement area and I think we have overdone it in some areas and all the rest.

But some how or other, if this is as good as everybody seems to believe and statistics prove, we ought to get COs to at least take a look at it for a few minutes, know what it is, and say we are not going to use it here because of whatever reason it is.

I would like to at least consider that on a pilot project, preferably administratively, because again I don't think the legislative approach is ideal, but we will craft something here which is sensible and modest. I know you will go at it. And then let's just swap the proposals and critique each other's. We have done a little bit of that in the past and we can carry on with the same tradition.

Mr. BEDELL. I look forward to that.

Senator LEVIN. We may have some additional questions. Perhaps in view of the record, some of my colleagues may also for you and the other witnesses, so we will keep the record open for a few days for that purpose.

We are grateful to both of you for coming this morning and for your efforts in this area.

We will stand adjourned.

[Whereupon, at 11:12 a.m. the Subcommittee recessed to reconvene at the call of the Chair.]





ADDITIONAL MATERIAL SUBMITTED FOR THE RECORD

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UNITED STATES SENATE  
COMMITTEE ON  
GOVERNMENT AFFAIRS  
SUBCOMMITTEE ON  
OVERSIGHT OF GOVERNMENT MANAGEMENT  
WASHINGTON, D.C. 20520-6250

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#### About the Author

Mr. A. J. Dell'Isola graduated from the Massachusetts Institute of Technology in 1950, Tau Beta Pi with a B.S. in Building Construction. He subsequently spent some twelve years overseas on airfield and related construction serving two of those years as an Officer in the Corps of Engineers.

In 1962, he pioneered the introduction of the value engineering (VE) concept to the construction industry at the Naval Facilities Engineering Command (NAVFAC), and subsequently for the Army Corps of Engineers. He entered private VE consulting in 1966.

Since that time, he has supervised or conducted over 500 value engineering/cost related studies on construction facilities valued at several billion dollars resulting in implemented savings of some \$500,000,000. He has conducted studies, workshops and seminars in some twenty-one countries. For example, he has been instrumental in introducing VE in Construction to countries such as Japan, Australia, Canada, Italy, South Africa, Mexico and Saudi Arabia. He has initiated and conducted seminars and studies for over twenty major corporations including AT&T, United Technologies, IBM, Alcoa, Owens-Corning Fiberglass, S.F. Goodrich, Ciba Geigy, Sea-Land Services and Automatic Data Processing.

In addition, he has conducted studies for over fifty state and local agencies. The major emphasis has been on some one hundred VE studies of wastewater treatment facilities for local authorities. Other principal agencies served were OMB, City of New York; State Architect's Office of Tennessee; Seattle METRO; Washington Metropolitan Area Transit Authority; Superintendent of Public Instruction; State of Washington; Director of Facilities, State of Maryland; and the Procurement Office, State of Wyoming.

Mr. Dell'Isola has also been instrumental in initiating and conducting studies for over twenty major governmental, principally Naval Facilities Engineering Command, Corps of Engineers, the Public Buildings Service of GSA, Veterans Administration, Department of Transportation, Environmental Protection Agency (Old Post Office Department) and Old Health, Education and Welfare Department, and NASA. He has testified before both the U.S. Senate and the House of Representatives on VE potential and served one year as a consultant to a Presidential Council on Management Improvement.

He has lectured extensively having introducing the VE concept to over twenty universities and over 15,000 professionals. He has been cited for his work in VE by the Engineering News-Record, The Society of American Value Engineers and the Society of Japanese Value Engineers.

Mr. Dell'Isola has authored the first text on construction VE entitled Value Engineering in the Construction Industry (1972), published by Van Nostrand Reinhold, 3rd Edition (1983), and co-authored two texts, Life Cycle Costing for Design Professionals and Life Cycle Cost Data published by McGraw-Hill (1981-1983).

**VALUE ENGINEERING POTENTIAL IN FEDERAL PROGRAMS**

It is a pleasure to have this opportunity to testify before this subcommittee on the potential for increased savings through expanding the use of value engineering programs.

**Background**

Traditionally, projects and procurements have been developed by generating a program of needs, using in-house or hiring consultants to develop procurement documents and subsequently procuring their needs. The approach fills the need for capital expenditures.

However, in the traditional approach there is no programmed input to fill the role of a formal attempt to implement any kind of Quality Control/Value Assurance Program in much of the process. In many areas of the industrial field e.g., computers, electronics, automobiles, aircraft, etc. formal Quality Control/Value Assurance Programs are a basic part of management controls over procurement. In the construction and related procurement in Federal agencies, very few similar formal programs have been accepted.

The techniques of life cycle costing and value engineering have been found by many owners to be quite successful in optimizing value and improving the return on investment (ROI) for a given project procurement. This is accomplished through systematic

application of these techniques during the development of procurement documents as a counter point "second look" at major decisions affecting the initial investment, operating costs or other related expenditures.

The current and specific emphasis on cost savings varies among government agencies from reducing initial investment cost to achieving long-term cost reductions, in such areas as energy consumption, maintenance and repair, replacements and alterations and staffing. However, there exist an additional need for saving time, money, energy, and other resources and thus improving efficiency, production and return on expenditures felt by every agency. It is recommended that the VE approach utilizing the key techniques to be covered in this presentation be considered to augment present methods of cost optimization.

Value Engineering (VE) is a rigorous, systematic problem solving methodology aimed at optimizing the costs of procuring products or services as well as optimizing the construction costs of a facility. VE makes these cost reduction possible without sacrificing desired performance levels.

Life Cycle Costing (LCC) as a technique, used during the VE approach. LCC focuses on optimizing energy consumption, maintenance and repair costs, replacement & alterations costs, staffing costs and tax elements. These items can account for over 60% of the total cost of ownership. Once a team of



multi-disciplined specialists using VE techniques explore ideas for design improvement. LCC analyses are prepared for the most viable alternatives in order to make final recommendations.

As an example illustration of the significance of these techniques applied to projects during the design phase, a hypothetical office building will be cited. During the planning stage of the project, the total initial cost was estimated to be \$48,486,000. The feasibility study indicated gross income from office rentals of \$8,850,000 and operating costs of \$3,110,000. The loan amount was determined by assuming that 75% of the project cost would be capitalized at 10% net income (using constant dollars). Dividing the before-tax stabilized cash flow by the required equity investment yielded a return on investment of 18.1%. This information is contained in Figure 1, Economic Survey. \*

Several scenarios are presented as to what might happen during the course of realizing the project. First, the project construction cost might rise 10% over that originally planned. This added increase in initial cost reduces the ROI to 12.1%. On the other hand, the designed facility operating costs for energy, maintenance, taxing, staffing, etc., might be 10% higher. If this were the case, the ROI would become 13.4%.

In the third situation, both the construction costs and the operating costs are assumed to be 10% higher than originally planned. The net result is an ROI of only 9.6%. In all three cases, the resulting ROI is less than the owner would have accepted during the planning phase and certainly represents a poorer return on investment.

In the final situation, through systematic application of the VE techniques during project design, the return on investment has increased to a dramatic 30.2%. The result is achieved by monitoring project costs throughout the design and applying both value engineering and life cycle costing techniques to reduce the construction cost by 5% and the operation cost by 5%. (This ROI includes the added cost of professional time for the VE effort. The 5% reduction in construction and operating costs are realistic expectations based on some twenty five years of experience of cost improvement for a typical facility using VE during project design.

Both VE and LCC are proven management tools used extensively in private industry and in several Federal agencies to identify ways to save time, money, energy, staffing and other resources without sacrificing necessary performance of service levels. Clients today are electing to use VE and LCC during the design process as a "second look" at a major design decisions to aid in project cost control, improve quality and value for their facilities, and optimize ROI.

The objective of this presentation is to illustrate how the Federal Government can augment utilization of these proven techniques to establish an audit procedure to accomplish the essential ingredients of a Quality Control/Value Assurance Program in the procurement of facilities and related services.

Figure 1  
Hypothetical Office Building  
Economic Survey

|                                         | As Planned<br>(Budgeted) | Construction<br>Costs + 10% | Operation<br>Costs + 10% | Construction<br>& Operation<br>Costs | Economic<br>Studies<br>Construction 5%<br>Operation 5% |
|-----------------------------------------|--------------------------|-----------------------------|--------------------------|--------------------------------------|--------------------------------------------------------|
| Total Construction Cost                 | 34,757,000               | 38,233,000                  | 34,757,000               | 38,233,000                           | 33,020,000                                             |
| Indirect Costs<br>(includes Economics)  | 9,249,000                | 9,711,000                   | 9,247,000                | 9,247,000                            | 9,062,000                                              |
| Land Cost                               | 4,480,000                | 4,480,000                   | 4,480,000                | 4,480,000                            | 4,480,000                                              |
| Total Project Cost                      | 48,486,000               | 52,424,000                  | 48,486,000               | 52,424,000                           | 46,562,000                                             |
| Less Mortgage Loan*                     | 40,583,000               | 40,583,000                  | 38,384,000               | 38,384,000                           | 41,686,000                                             |
| Equity Investment Required              | 7,903,000                | 11,841,000                  | 10,102,000               | 14,040,000                           | 4,876,000                                              |
| Gross Income                            | 8,850,000                | 8,850,000                   | 8,850,000                | 8,850,000                            | 8,850,000                                              |
| Operating Costs                         | 3,110,000                | 3,110,000                   | 3,421,000                | 3,421,000                            | 2,954,000                                              |
| Net Income*                             | 5,740,000                | 5,740,000                   | 5,429,000                | 5,429,000                            | 5,896,000                                              |
| Less Mortgage Payment<br>(Debt Service) | 4,305,000                | 4,305,000                   | 4,072,000                | 4,072,000                            | 4,422,000                                              |
| Before Tax Stabilized<br>Cash Flow      | 1,435,000                | 1,435,000                   | 1,357,000                | 1,357,000                            | 1,474,000                                              |
| (Return on Equity<br>Investment)        | 18.1%                    | 12.1%                       | 13.4%                    | 9.6%                                 | 30.2%                                                  |

\*Loan amount determined by 75% of capitalized (@ 10%) net income

$0.75 \times \$5,740,000 \times 9.427 \text{ (PWA)} = \$40,538,000$

$0.75 \times \$5,429,000 \times 9.427 \text{ (PWA)} = \$38,384,000$

$0.75 \times \$5,896,000 \times 9.427 \text{ (PWA)} = \$41,686,000$

## PART II - VALUE ENGINEERING TECHNIQUES

## A. Overview of Concept

## Introduction

Value Engineering (VE) is a management tool to optimize costs. Value Engineering seeks to manage cost and change on purpose rather than by accident, as too often occurs in many of today's projects. Value Engineering (VE) was introduced into industry in the early fifties at General Electric (GE) by Larry Miles. GE used the concept to improve production line output. However, the results attained warranted use of VE to reduce costs in all areas. The real impetus for the concept in government occurred under Secretary of Defense McNamara whose Cost Reduction Program served as the vehicle to introduce the value engineering concept to all Department of Defense Procurements.

The concept has been applied to all phases of the procurement including hardware, systems, weapons and facilities.

## Definitions

Per U.S. Government Department of Defense:

VM - An organized effort directed at analyzing the function of systems, products, specifications/standards, practices, and procedures, for the purpose of satisfying the required function at the lowest cost of ownership without reducing needed quality.

Per VM Division of SH&G

VE a planned expenditure of time and effort whose objective is to optimize the cost of ownership of a system or facility.

The planned effort consists of use of the value engineering job plan, an organized problem solving procedure. Optimization infers the lowest expenditure of owner funds while meeting required functions considering tradeoffs desired by the owner of such things as aesthetics, environment, safety, flexibility and reliability. The cost of ownership is the sum of all expenditures required to realize and operate the system or facility over a given time span using the concept of equivalent costs.

Presently, there are full time value engineers in all major procurement areas of the Department of Defense. The major ones being the Army Material Command, Naval Ship Systems Command, Air Force System Command, Naval Facilities Engineering Command, and the Corps of Engineers.

There are also full time programs in other U.S. Government agencies such as: Environmental Protection Agency, Veterans Administration, Bureau of Reclamation and Department of Transportation. Also, there are state, municipal and non-government organizations who have full time programs. For example, Office of Management & Budget of the City of New York, Facilities Procurement Offices of the States of Washington,



Maryland, Virginia and Pennsylvania and several large private corporations such as RCA, General Electric, General Motors, Ford Motors, Owens Corning Fiberglas, Minneapolis Honeywell, Sylvania, General Dynamics, Lockheed, Newport News Shipbuilders and United Technologies, etc.

As for the foreign area, the leader in the use of VE is Japan. There are more members in the Society of Japanese Value Engineers (SJVE) than in the U.S. Emphasis in Japan has been placed in the industrial area e.g. steel, computers, electronics, auto and construction area. An item of a note, there are over two hundred full-time Value Specialists working in the Japanese steel industry and none in the U.S. This fact could be one of the reason why the U.S. has lost its competitive edge.

Results of the various programs have varied with savings averaging some 5% to 10% reduction in initial costs and widely differing results to follow-on cost depending on emphasis. As for VE in facilities procurement, based on some ten years and three hundred projects, the VM Division of SH&G has implemented results averaging over 5% in initial costs and some 5-10% on follow costs. Best results have been attained on large municipal projects (NYC of over 100 to 1, Return On Investment (ROI)) and wastewater treatment plants (over 80 to 1 Return On Investment), and other government type facilities especially military projects.

### Key Ingredients

To make Value Engineering work and to be effective there are three essential ingredients. These ingredients separate VE from other cost-saving program.

These are:

Executive Involvement  
Substantive Investment  
Systematic Effort

Executive involvement - requires a positive attitude by management toward optimizing/saving costs. If executives are measured solely on how much they spend and/or how many people they supervise, effective use of the VE concept is doomed. Implementation of proposals that reduce costs or staffing do not occur if executive appraisals do not include such factors as cost effectiveness and optimal use of funds. An executive responsible for expenditures must convince employees he is sincere about optimizing/saving funds. He must act quickly to solve problems, and encourage change by approving good ideas. Lastly, he must demand results in optimizing expenditures as part of his staff evaluation programs. Saving money is much more difficult and less agreeable than spending money. Few people will volunteer to take the lead-as such, positive executive involvement is the key ingredient to an effective program.

**Substantive investment** - must also occur for an effective program. Initially, an investment is required to educate key employees on VE concepts. A program of planned studies, using selected major expenditures must also be initiated. To round out the investment required, ideas for program implementation need to be tested and ways to implement changes must be developed. As a rough guide used to establish several large government oriented programs, investment of one-tenth to five-tenths of one percent of total expenditures have been used. For example, the U.S. Navy Facilities Engineering Command on their world wide annual programs of some two billion dollars are investing some two million in their program.

The Environmental Protection Agency has a mandatory program for value engineering on all projects over ten million dollars. EPA has invested some twenty-five million dollars over the past seven years on a program worth a total expenditure of some 7.5 billion dollars or a little over 0.3%.

**Systematic effort** - utilizing the proven methodology of value engineering for selected applications of major expenditures must be undertaken. The purpose is to optimize cost by making changes happen on purpose rather than by accident. It must be a systematic and time phased effort for effective results. Many programs have failed because the effort has been used for personal attainment, or for objectives other than optimizing total cost of ownership, or have been initiated too late in the procurement process.

Value Engineering not only requires the above three essential ingredients, but these ingredients require a climate conducive to:

- Identifying Waste
- Challenging Tradition
- Suggesting Change
- Individual Growth

These must occur without fear of personal loss to both executives and all employees. In fact, an award program for generating savings would provide a more positive climate.

#### Methodology Discussion

Unnecessary costs exist in a product or design because of several general factors. These are:

- Lack of an Idea
- Lack of Information
- Temporary Circumstances, eg. time, people
- Honest Wrong Beliefs
- Habits and Attitudes

The VE effort develops a cohesive team of self motivated-achievers committed to a common objective. The objective is to "optimize" owner expenditures using a planned effort that augments traditional input to offset each of the above factors.

The Job Plan is built around the scientific approach to problem solving and consists of the following major phases:

Information  
 Speculative/Creative  
 Analytical  
 Proposal  
 Implementation

The above steps can be added to or augmented but all follow a similar philosophy that includes:

**Information Phase** - Collect information and review data utilizing various techniques to determine high cost-poor worth areas using the function approach. Work on habits and attitudes to create more responsive environment for change.

**Speculative/Creative Phase** - Generate alternate ideas to meet the functions of the high cost - poor worth areas isolated using a selected team and brainstorming techniques.

**Analytical Phase** - Analyze and evaluate ideas, listing advantages and costing out alternatives using life cycle costing techniques. Select alternates that have potential to optimize costs and, whenever applicable, conduct evaluations to determine if they meet all other required functions. Offset temporary circumstances that cause high costs.



**Proposal Phase** - Prepare written proposals to document alternates with enough data to allow decision-makers to evaluate and make decisions on proposals. Concentrate on offsetting honest wrong beliefs and habits and attitudes and roadblocks.

**Implementation Phase** - Follow-up activities to document proposals accepted, reasons for rejections and validation of initial and life cycle cost savings.

## PART B - APPLICATION TO FEDERAL PROGRAMS

## Potential in Federal Programs

General

Value Engineering (VE) has potential for savings in any agency that spends money. The potential for savings will vary directly in proportion to the amount of spending and the type of expenditure. VE potential in an agency whose major expenditures are tied to laws (entitlements) are limited. That is, expenditures like Social Security and Veterans benefits are not applicable to the VE approach. Also, Agencies that have limited budgets and only deal with specialized research and development programs have limited VE potential. However, when these research and development programs lead into major expenditures eg. shuttle program and earth station (NASA) and prototype nuclear reactors significant potential for Value Engineering should be available.

Reference is made to Table 1 for a rough estimate of the significance VE can have federal programs. The agencies under this subcommittee (eg. DOT, EPA, GSA, NASA, DOE and VA), when compared to similar outside agencies (eg UT, NYC, AMC and GDMW) with VE programs, can easily double their results.

## Results of Selected Programs

Results on application of VE techniques to recent programs with large expenditures base on best available data have been as follows:

TABLE I - RESULTS OF VE PROGRAM

| <u>Agency</u>                                                            | <u>Approx. Annual<br/>Expenditure</u> | <u>Program Costs<br/>(in millions)</u> | <u>Approx. Savings<br/>(in millions)</u> | <u>Approx. %<br/>of Savings<br/>on Total</u> |
|--------------------------------------------------------------------------|---------------------------------------|----------------------------------------|------------------------------------------|----------------------------------------------|
| 1. Environmental<br>Protection Agency                                    | \$2.3 Billion (US)<br>1981 - 1984     | \$ 20                                  | \$ 300                                   | 1 2/3                                        |
| 2. Dept. of Transp.<br>Federal Highways                                  | \$12 Billion (US)<br>1981 - 1986      | Unknown                                | \$ 500                                   | 1 1/2                                        |
| 3. Army Corps of<br>Engineers                                            | \$1.4 Billion (US)<br>(1984)          | \$ 3                                   | \$ 75                                    | 5                                            |
| 4. Naval Facilities<br>Engineering Command                               | \$2.4 Billion (US)<br>(1984)          | \$ 2                                   | \$ 125                                   | 5                                            |
| 5. Army Materials<br>Command                                             | \$10 Billion (US)<br>1984 - 1986      | \$ 45                                  | \$4,000                                  | 3 1/3                                        |
| 6. Veterans Admin.<br>Office of Facilities                               | \$200,000,000                         | \$2.0                                  | \$ 45                                    | 4                                            |
| 7. Supt. of Public Instr.<br>School of Facilities<br>State of Washington | \$75,000,000<br>(1984)                | \$0.5                                  | \$ 5                                     | 6                                            |
| 8. Office of Management<br>and Budget<br>City of New York                | \$2 Billion<br>(1981 - 1986)          | \$1.0                                  | \$140                                    | 3 1/2                                        |
| 9. Design & Constr.<br>United Technologies                               | \$100,000,000<br>1984 - 1986          | \$0.5                                  | \$ 60                                    | 20<br>(LCC savings)                          |
| 10. Gen. Directorate of<br>Military Works,<br>Kingdom of Saudi Arabia    | \$10 Billion                          | \$0.5                                  | \$300*                                   | 6                                            |

\* In process of implementation

### Recommendations

In dealing with VE for the past twenty-five years, effective results have not been attained without a mandated program. As previously stated, saving money is much more difficult and not as amenable as spending money. As a result, effective, significant results will not be attained without:

1. A mandated program specifying some lower level of participation and basic ground rules of operation.
2. Review of existing programs and augmentation of new actions to improve results.
3. An overview of the results at the level having fiscal responsibility. Unless there is fiscal responsibility in the approval/rejection of proposals, personal rather than fiscal criteria will influence decision making.

### Discussion

Regarding recommendation 1 and 2 above, VE programs should be applicable to all the agencies of government that spend money. Again, the degree will vary as previously stated in proportion to non-regulated expenditures.

As shown in Table No. 1, The Department of Transportation program has the greatest potential for expansion since it has the lowest percentage expenditure of any agency. Program costs for VE in this agencies should be approx. 0.3% of their total program. The

largest potential of all their agencies would appear to be Federal Highways, by making VE mandatory for any grant funded Highway project over \$5,000,000. Saving over the past 6 years should have been closer to 5 billion versus the 500 million indicated. It should also be mentioned that the limitation set by UMTA, of \$150,000,00 new project cost for mandatory is far too low. A minimum project costs (which can be changed later) of \$10,000,000 similar to the present EPA limit would appear more realistic. Their results (12 million in 1983) on expenditures of over 1.5 billion falls far short of other programs in Table I and should approach ten times that amount.

As for the Environmental Protection Agency, their program is mandatory for wastewater projects over \$10,000,000. This figure is much too high when compared to the other agencies listed. For example, most of the other agencies use a bottom limit of approximately \$2,000,000 project costs. By lowering their limit to say \$2,500,000 saving should easily double for that Agency with less than a doubling of program costs. However, the area of greatest concern is the superfund program. It is estimated that a mandatory program for the 4-5 billion dollar planned expenditure should produce savings in the range of \$2-300,000,000/yr.



Other agencies which are recommended specifically for review are:

1. The General Administration which is essence has disbanded its program which was one of the best in all government. Legislative action is needed to assure continuous implementation of the program since individual administrator attitudes change, and generally new appointees seldom understand the concept.
2. The Postal Service is another agency who has de-emphasized VE. Legislation requiring VE on projects and procurements over \$2,500,000 should yield saving of up to \$150,000,000/yr.
3. The Department of Energy and NASA should be studied for implementation of a formal program. VE has definite application in their expenditures such as research procurement, nuclear power and weapons as witnessed by the extensive use of VE in DOD procurement and the VE program established at United Technologies. Also, since a bulk of their procurements are CPAF, a separate programmed level of VE should be considered at the headquarters level to augment the review of key expenditures. The first effort that is required with these agency is an executive exposure to VE because they presently do not understand the concepts and have negative attitudes.

For example, attached as Table II is the result of the projects studied under the UT program. It must be noted that many of the projects are similar to those under DOE and NASA agencies and the results are quite significant.

4. As far as discussing the establishment of a fiscally responsible overview of the VE program, a review of the City of New York program is appropriate. Their program was established by their Office of Management & Budget as a direct effort to provide them with a tool to realize projects within budgets. As a result of their program (as well as UT's) they are not only realizing more projects within budget but capital and LCC reductions allowing a greater utilization of their limited capital funds. By having their program control at the fiscal level, review of VE proposals which are to the benefit of the overall budget are realized. When the program control is at the lower agency level, once a budget has been allocated there is little incentive to return funds. Also, there has been instances where project economics have been questioned. This does not occur when (as in DOD) the VE proposal approval rests within a technical Division of the agency.

In the City of New York, the Office of Management and Budget has contracted with several Value Engineering Consultants. These consultants under OMB direction develop scopes and conduct studies. Attached as Table III are results of their program.

TABLE II

UNITED TECHNOLOGIES  
CONSTRUCTION AUDIT PROGRAM

SUMMARY REPORT

AUDIT ACTIVITY

|                    |             |             |            |             |
|--------------------|-------------|-------------|------------|-------------|
| No. of Audits      | 17          | 13          | 8          | 38          |
| GSF Studied        | 1,271,925   | 1,719,321   | 543,939    | 3,535,185   |
| GSF Area Increased | 120,025     | 95,103      | 30,939     | 246,067     |
| ECC Value Studied  | 122,287,000 | 135,440,000 | 38,710,000 | 296,437,000 |
| Fee Paid           | 101,800     | 159,560     | 75,000     | 336,260     |

SAVINGS IDENTIFIED

|                 |           |            |            |            |
|-----------------|-----------|------------|------------|------------|
| Initial Capital | 3,910,000 | 16,785,000 | 15,845,000 | 36,540,000 |
| O&M Annual      | 145,000   | 1,255,000  | 751,000    | 2,151,000  |
| LCC (Ten-Year)  | 5,360,000 | 29,335,000 | 23,355,000 | 58,050,000 |

STATISTICS

|              |       |       |       |       |
|--------------|-------|-------|-------|-------|
| GSF Control  | 10.4% | 5.9%  | 6.0%  | 7.5%  |
| (% Increase) | 4.4%  | 21.7% | 60.3% | 19.6% |
| ROI LCC/Fee  | 50:1  | 185:1 | 320:1 | 170:1 |

The program is applied across the board to all groups and divisions of UTC.

These include:

Power Group:

Pratt & Whitney Eng. Div.  
Pratt & Whitney Mftg. Div.  
Pratt & Whitney Gov. Products Div.  
Pratt & Whitney Canada  
Elliott Company  
Power Systems Division  
International Support Systems

Bldg. Systems Group:

United Technology Bldg. Sys. Ctr.  
Otis Elevator  
Carrier Corporation  
Essex Group

Defense Systems Group:

Sikorsky Aircraft  
Norden Systems  
Chemical Systems Division  
USBI

Controls Group:

Hamilton Group  
Industrial Group  
Automotive Group  
United Tech. Research Ctr.  
United Tech. Microelectronics Ctr.

TABLE III

CITY OF NEW YORK  
OFFICE OF MANAGEMENT & BUDGET

VALUE ENGINEERING CAPITAL SAVINGS  
THROUGH FIRST QUARTER FY87

(DOES NOT INCLUDE ANNUAL OPERATING OR DEBT SERVICE COST/SAVINGS)

| <u>Projects</u>                                        | <u>Total<br/>Project Cost</u> | <u>Capital<br/>Savings</u> | <u>Cost of VE<br/>VE Consultant</u> |
|--------------------------------------------------------|-------------------------------|----------------------------|-------------------------------------|
| White Street Jail                                      | \$ 82,600,000                 | \$ 21,644,000              | \$ 170,000                          |
| East Facility Jail                                     | 94,100,000                    | 9,124,000                  | 101,000                             |
| Police Plaza Reconstruction                            | 7,700,000                     | 4,781,000                  | 42,000                              |
| Fresh Kills Barge Unloader<br>and Landfill Development | 250,000,000                   | 38,366,000                 | 130,000                             |
| Central Park Precinct<br>Reconstruction                | 4,800,000                     | 659,000                    | 24,000                              |
| Astoria Pool Construction                              | 21,700,000                    | 4,430,000                  | 64,000                              |
| LaGuardia Community College<br>Expansion               | 89,100,000                    | 2,750,000                  | 78,000                              |
| Elmhurst Hospital Modernization*                       | 185,700,000                   | 23,705,000                 | 70,000                              |
| 41st Police Pct., Bronx<br>New Facility                | 9,200,000                     | 1,189,000                  | 14,000                              |
| Rescue 1 Firehouse - New Facility                      | 2,800,000                     | 112,000                    | 14,000                              |
| NYC Aquarium - Sea Cliffs<br>Expansion (New Exhibits)  | 17,600,000                    | 1,928,000                  | 50,000                              |
| Prospect Park Zoo<br>Reconstruction                    | 28,300,000                    | 2,900,000                  | 70,000                              |
| Mini School Prototype                                  | 1,700,000                     | 148,000                    | 35,000                              |
| Carpenter Avenue Area Street<br>Reconstruction, Bronx  | 19,000,000                    | 2,400,000                  | 60,000                              |
| Finalized Subtotal                                     | \$814,300,000                 | \$114,136,000              | \$922,000                           |

Additional Savings Under Review

|                                                |                     |                   |                      |
|------------------------------------------------|---------------------|-------------------|----------------------|
| City Net Data Network                          | 21,600,000          | 2,000,000         | 140,000              |
| Times Square Subway Station<br>Modernization   | 85,600,000          | 9,069,000         | 170,000              |
| P.S. 269, Brooklyn, Addition<br>and Renovation | 8,300,000           | 331,000           | 14,000               |
| Elmhurst Hospital                              | <u>Incl. above)</u> | <u>12,850,000</u> | <u>(incl. above)</u> |
| Under Review Totals                            | \$115,500,000       | \$24,250,000      | \$324,000            |
| GRAND TOTALS                                   | \$929,800,000       | \$138,386,000     | \$1,246,000          |

ROI approx. 125:1

VE cost in Total Project Costs 0.1%

\* Indicates projects with additional savings under review

Conclusion

There is no doubt that significant additional saving in both initial and LCC costs exists by legislating and/or expanding the VE programs in most government agencies. There are some personal views that are recommended for further consideration.

These are:

1. In order to accomplish this objective, a government agency with overall fiscal responsibility (OMB is suggested) should be designated for responsibility of implementation, a change in attitude, in agency executives. It is much harder to save money than spend money. The attitude that "not one dollar can be removed (saved) from my agency, or the agency will collapse or the countries economy will collapse if one dollar of their budget is touched, must be overcome.
2. Any legislated programs for VE should be established to realize savings not only for initial capital costs but also for follow-on (LCC) costs. There is as much, or greater, potential in follow-on costs/savings than in initial capital expenditure.
3. There should be some consideration to make the program self funding. For example, in Saudi Arabia we are setting up a program where from 3-5% of all implemented VE saving



VE change proposals, are being set aside for additional VE services and for any other implementation costs. The remaining savings can be used for reducing (other) budget overruns and for funding additional projects.

As an example, in Saudi Arabia the Minister of Defense wanted to get a project of some \$25,000,000 (US) immediately pulled off the "on hold" category and built. Under the Direction of the Directorate of Military Works a large project (\$165,000,000) that was in the process of being bid was selected for VE. Over \$35,000,000 (US) was isolated and being implemented. The funds saved will be used to fund the needed project.

4. Some consistency in the review of large expenditures of funds for all agencies using VE techniques should be considered. As can be seen from Table 1, these are large inconsistencies in agencies expenditures and results.
5. An enlightened awareness to increase our efficiencies of expenditures is needed. For example, in dealing with a group of Japanese industrialists to build an automotive plant, they expressed certain concerns. They indicated a plant that costs in Japan some \$150,000,000 (US) would cost some \$300,000,000 in the U.S. "Why do American designers insist on building mausoleums to antiquity?" was expressed. Japan has more Value Engineers than the

U.S.. Japanese steel industry has hundreds of full time VE specialists while the U.S. has none. They have active participation in VE in most of their major fields.

We will end with an actual case study of the applicability of what has been expressed. Several years ago, a large defense contractor was producing a "black box" for the Department of Defense for a fighter aircraft. Since it was a cost plus contract, weight was the dominant factor. The first attempt to produce a suitable product resulted in an "overweighted" product. The product manager called the VE section to study the item to "reduce weight". A multi-discipline group was assembled and followed the VE job plan and "reduced weight" - and in the process "reduced cost".

The product manager was very disturbed that not only did they not reduce weight enough but that the cost reduction had cost millions in profit to the company.

As a result, he directed that another study be conducted and strongly indicated that costs be left alone. The second study met weight requirements - but reduced cost again. The manager called in the Value Engineer, who thought he would be fired for reducing costs again. The manager put his arm around the value engineer, who thought he might be choked. Instead, the manager took him to the

window overlooking the huge parking lot. "Choose your parking spot", he indicated to the VE. "What happened?" replied the Value Engineer. We can actually compete costwise with this product with the Japanese was the answer!

## Appendix A

## ARTICLE FROM VALUE DIGEST

April 1987

Excerpt from Value Digest

Publisher's Pipeline, by Hal Tufty, CVS, FSAVE, April 1987

VALUE ENGINEERING

Think of the cheers that would greet a Secretary of Defense who announced he had found a way to reduce spending by 10% without touching a program or quality. Think of the acclaim that would envelop a Director of CMB who said we have found a way to spend a little less on every construction project, every highway or dam or building without delaying the work.

As deficits grow, as Congress and the Executive Branch struggle to make a dent in them, think finally of our incredible thickheadedness in not using a proven technique for cutting costs and bringing cheers and acclaim and true fiscal responsibility to our troubled economic life.

For over 40 years, some parts of industry and some parts of government have from time to time made use of a technique called "Value Engineering." It is, like a second medical opinion, just looking carefully at the facts and considering alternatives. In the case of Value Engineering, it is looking at construction and manufacturing components and techniques with a trained eye for what might be done differently without jeopardizing quality, safety, or reliability over the life of the product.

Begun essentially by a single, determined cost-conscious patriotic engineer working for GE during the Second World War, it has come and gone as an industrial technique because it seemed easier in an expanding economy to do things automatically, bureaucratically, and comfortably, simply adding a profit on whatever costs there were. But those companies which have worked with the U.S. government and resisted that casual inclination have saved millions for taxpayers and earned millions for themselves and their shareholders.

As a result of 793 Value Engineering Change Proposals being accepted by the Department of Defense in 1985, the government and the taxpayers saved \$339 million. But much more can be saved and should be saved. Value Engineering provides economy, increased efficiency and improved safety without diminishing quality. Using Value Engineering to cut costs does not mean cutting corners.

Beyond those actual examples, there is substantial evidence from unbiased sources that Value Engineering can do what it claims. The United States Government Accounting Office (GAO) has done a series of studies on Value Engineering in various federal agencies during the past 15 years. Their reports have been uniformly positive about the use of Value Engineering as a cost effective, cost saving method.

Over a dozen years ago, after studying 10 federal agencies, GAO determined that Value Engineering was a "proven cost saving technique..." and recommended that all federal construction agencies "establish Value Engineering incentive programs." GAO also said it "believes that Value Engineering should be integrated into Defense's overall approach to reducing costs and improving productivity."

The wise analysis and recommendations of GAO deserve both acclaim and cheers. Most of all they deserve to be implemented now because the only loser, when Value Engineering is employed, is lethargic, bureaucratic, tired old ways of doing things in a more costly, less efficient way.

The winners are equally clear: all of us. Taxpayers' money is saved; deficits are reduced; corporations profit from it; and better products flow from it, thus bringing jobs back from overseas. It is time for Value Engineering to be uniformly and more widely applied.

#### VALUE ENGINEERING -- QUESTIONS AND ANSWERS

Q. I understand mechanical engineering, electrical engineering, civil engineering. What is "Value Engineering?"

A. Value Engineering is a systematic technique for identifying and eliminating unnecessary costs in manufacturing or construction, by analyzing the functions of facilities, systems, equipment, installations, operations, maintenance, repair, replacement, procedures and supplies.

The first answer continues:

Without forsaking efficiency or quality, its purpose is to identify and provide alternatives to any features, equipment or methods that could possibly be eliminated or modified to achieve the lowest possible life cycle cost.

Q. Isn't it just another name for cost-cutting?

A. No, Value Engineering is not simply seeking cheaper material. It is more than that, although cost-cutting is certainly a serious consideration. Value Engineering complements, rather than replaces, other cost-reduction, or cost-control techniques. It does not look for the cheapest components or actions which degrade performance, maintainability, or reliability. It asks whether alternate materials or methods could be used to perform the same job and meet the functional requirements.

Design, construction, operations, maintenance and replacements are all considered. Simply, the objective is to ensure that the required functions of any project will be accomplished at the lowest life cycle cost, consistent with required performance, reliability, maintainability and safety.

Q. Who does Value Engineering?

A. Value Engineering is done by a multi-disciplined team. Depending upon the object being studied, the team might be composed of an architect, an engineer, a cost estimator, and others such as a contractor, manager, metallurgist, scientist, or operating personnel. Also distinctive is the fact that the team consists of people who were not involved in the previous decisions.

Q. How does Value Engineering work?

A. A Value Engineering team, after its analysis, may redesign, combine, or eliminate inefficient or excessively costly project components or construction methods by recommending different, new, or more efficient, technology materials or methods.

Q. Be more specific. What does a team do?

A. There are several essential steps. The Value Engineering team first familiarizes itself with the design and then focuses on areas with greatest potential for significant savings or improved performance. Then, a team undertakes a function analysis. Next, the team creatively asks: Are there other ways to achieve the same basic functions by different means?



Those new ideas or approaches generated by asking questions are ranked in terms of potential savings. Cost-reduction alternatives are precisely described and specific actions are recommended. Ultimately the purchaser or manufacturer must decide which recommendations to implement.

Q. Isn't this just like a second medical opinion?

A. There are similarities, but a Value Engineering team gives more than diagnosis, and a yes or no answer. Because its members keep abreast of the latest changes in materials and standards and are interested in process as well as hardware, the team can offer insights that may escape an absolutely excellent architect, builder or engineer. Like a second doctor, however, the team has the advantage of independence and distance.

Q. Is Value Engineering a new technique?

A. No. It began during World War II when General Electric found certain critical materials were not available. In the post-war period, GE continued to use Value Engineering methodology for production where a variety of materials were available. It has continued to grow as a discipline in construction and industrial work, but it is not nearly as widely or consistently used as it might be.

Q. Why don't all companies use the technique?

A. There is often built-in resistance to a Value Engineering study by designers and program managers who do not want their work reviewed and possibly questioned. It may seem a challenge to their own abilities, rather than assistance from specialists in value assessment. Middle and even top management, particularly if things seem to be working smoothly, may also resist because they think their techniques are good enough.

Often objections to a Value Engineering study come from people who feel -- erroneously -- their professional capabilities are being questioned. Sometimes, managers think Value Engineering will delay a project or that time will be wasted in responding to suggestions. Sometimes companies are fearful that proprietary information will be lost to competitors.

Old ways are often comfortable and we all know that many managers resist new and innovative approaches. Whole industries -- like steel and autos in the United States -- sometimes behave that way. Value Engineering is a way to overcome that mindset, whether it is corporate, government or personal.

Q. When is the optimum time for a Value Engineering study?

A. Early in the design stage is the best time because the chance for delay is diminished, and the ability to make changes greater. Decisions made early have the greatest impact on ultimate cost, but Value Engineering is a useful tool at any stage of design, or even into production.

Q. Have the benefits of Value Engineering been studied?

A. Yes, they have. Value Engineering invariably brings far greater savings than the cost of doing it. Obviously, the ratios vary according to the job and the areas of work, but savings in a ratio of 2 to 1 are routine and 20 to 1 is not uncommon. As a rule of thumb, Value Engineering should save 5% to 10% of total project costs.

Q. Are there specific examples to demonstrate those examples?

A--Yes, there are many and the amounts are clearly defined. Because the Department of Defense will share Value Engineering savings with a contractor, companies have submitted Value Engineering Change Proposals (VECPs) and have measured cost savings because they share the gain. One major defense contractor has submitted over 800 VECPs during a 20 year period. Documented savings amounted to \$112 million, with the government's share \$64 million and the contractor's \$48 million.

Q. What other federal agencies use Value Engineering?

A. Over the years, at least 14 federal agencies, including the Army Corps of Engineers, NASA, TVA, VA, and GSA have used Value Engineering with varying degrees of success. Only the Environmental Protection Agency (EPA) is required by law to use it and then only on projects over \$10 million.

The Corps of Engineers has had a Value Engineering program for over 20 years and has saved over \$1 billion. One report of VE studies on 247 highway projects for federal and state agencies found potential savings of 17.5%, or \$259 million on a total projected project cost of \$1.48 billion.

EPA in 1975-6 voluntarily used Value Engineering on eight projects and saved \$16 million. As a result, EPA broadened its Value Engineering program and reported net savings of \$156 million during the 1977-80 period.

Q. Why aren't all federal agencies required to use Value Engineering, if it is so cost-efficient?

A. For one reason, there are no strong advocates for using the technique. Like private corporations, federal agencies often find old and simple ways adequate. Bids are called for, contracts let, the law is followed. Without legislation directing that Value Engineering be done, bureaucratic lethargy takes over. Employees who understand and appreciate Value Engineering move on to other jobs and voluntary Value Engineering efforts diminish.

Q. Could this be changed?

A. Certainly. Legislation recommending or mandating a Value Engineering effort will be introduced into the 100th Congress. But even before that, agencies could be encouraged to embark on a voluntary Value Engineering effort on their own. It would seem particularly appropriate at a time of large federal deficits and pressures to cut federal expenditures.

Q. Is Value Engineering taught in engineering schools?

A. Fewer than a dozen major engineering schools include even an elective course in Value Engineering in their curricula. Both the number of universities and courses in Value Engineering continue to increase. Value Engineering is less a formal discipline, however, than it is an analytic and systematic approach to how we build or manufacture.

It is an organized way of thinking or looking at something, involving an objective appraisal of functions performed by parts, components, products, equipment, procedures, services. It can be taught in a prescribed curriculum, but it can also be learned in many ways in many fields after graduation.

STATEMENT OF  
MR. JOHN A. MITTINO  
DEPUTY ASSISTANT SECRETARY OF DEFENSE  
(PRODUCTION SUPPORT)  
OASD(P&L)

BEFORE THE  
SUBCOMMITTEE ON  
OVERSIGHT OF GOVERNMENT MANAGEMENT  
OF THE  
GOVERNMENTAL AFFAIRS COMMITTEE

U. S. SENATE

APRIL 29, 1987

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DIRECTORATE FOR FREEDOM OF INFORMATION  
AND SECURITY REVIEW (OASU-PA)  
DEPARTMENT OF DEFENSE  

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GOOD MORNING MR. CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEE, I AM PLEASED TO APPEAR BEFORE YOU TO DISCUSS VALUE ENGINEERING IN THE DEPARTMENT OF DEFENSE. WE BELIEVE WE HAVE AN EXTENSIVE EFFORT WHICH IS YIELDING SIGNIFICANT BENEFITS. IN THE SHORT TIME ALLOTTED TO ME, I WANT TO DESCRIBE FOR YOU SOME OF THE IMPORTANT ASPECTS OF OUR PROGRAM.

VALUE ENGINEERING WAS INTRODUCED INTO THE DEPARTMENT OF DEFENSE IN THE MID-1950'S IN THE OLD BUREAU OF SHIPS, NOW KNOWN AS THE NAVAL SEA SYSTEMS COMMAND. IN 1962, IT BECAME A DEPARTMENT OF DEFENSE PROGRAM. IN 1981, WE UNDERTOOK A MAJOR EFFORT TO REVITALIZE VALUE ENGINEERING AND WE CONTINUE TO ADJUST THE PROGRAM TO RESPOND TO OUR CHANGING NEEDS.

TODAY WE VIEW VALUE ENGINEERING AS IN INTEGRAL PART OF OUR EFFORTS TO IMPROVE PRODUCTIVITY AND REDUCE COST BOTH FOR OUR IN-HOUSE ACTIVITIES AS WELL AS OUR CONTRACTOR BASE. IN ADDITION IT IS USED IN CONJUNCTION WITH A NUMBER OF ACQUISITION INITIATIVES TO IMPROVE OUR OVERALL ACQUISITION PROCESS. THROUGH THE USE OF THE VALUE ENGINEERING CONTRACT CLAUSES CONTAINED IN THE FEDERAL ACQUISITION REGULATION, OUR CONTRACTORS AND SUB-CONTRACTORS CAN PARTICIPATE. UPON ACCEPTANCE OF THEIR CONTRACT CHANGE PROPOSALS, CONTRACTORS AND SUB-CONTRACTORS SHARE IN THE RESULTING SAVINGS. LATER I SHALL DESCRIBE IN MORE DETAIL OUR USE OF THESE CLAUSES.

WE HAVE AN IN-HOUSE VALUE ENGINEERING PROGRAM LARGELY CENTERED AT DEFENSE OWNED INDUSTRIAL FACILITIES SUCH AS REPAIR,

MAINTENANCE AND OVERHAUL FACILITIES AND SUPPLY ACTIVITIES. THESE INCLUDE NAVY SHIPYARDS, AIR LOGISTICS CENTERS, ARMY DEPOTS AND ARSENALS AND DEFENSE SUPPLY CENTERS. IN FISCAL YEAR 1986, DEPARTMENT OF DEFENSE COMPONENTS REPORTED THAT MORE THAN SEVEN THOUSAND VALUE ENGINEERING PROPOSALS WERE ACCEPTED. SAVINGS FROM THESE ACTIONS, CALCULATED FOR A THREE YEAR PERIOD, ARE ESTIMATED AT OVER ONE BILLION DOLLARS. ESSENTIALLY, THE TREND OF THESE REPORTED SAVINGS HAS BEEN UPWARD SINCE 1980.

THE DEPARTMENT OF DEFENSE HAS PIONEERED THE USE OF VALUE ENGINEERING CONTRACT CLAUSES WHICH ENCOURAGE CONTRACTORS TO SUBMIT CONTRACT CHANGES THAT WILL SAVE MONEY. THESE CLAUSES, FIRST CONTAINED IN THE ARMED SERVICES PROCUREMENT REGULATIONS, WERE REWRITTEN AND INCLUDED IN THE DEFENSE ACQUISITION REGULATION AND ARE THE BASIS FOR THE CLAUSES NOW CONTAINED IN THE FEDERAL ACQUISITION REGULATION. IN FISCAL YEAR 1986, DEPARTMENT OF DEFENSE COMPONENTS ESTIMATED SAVINGS OF \$453 MILLION, A FURTHER INCREASE FROM THE APPROXIMATELY \$340 MILLION REPORTED IN FISCAL YEAR 1985. REPORTED SAVINGS HAVE MORE THAN QUADRUPLD SINCE THE 1980-1981 TIME PERIOD. THE DEPARTMENT INCLUDES THESE CLAUSES IN ALMOST ALL CONTRACTS OF \$100,000 OR MORE AND, EXCEPT FOR STANDARD COMMERCIAL ITEMS, IN ALL SPARES CONTRACTS OF \$25,000 OR MORE.

DEPARTMENT OF DEFENSE CONTRACTS REQUIRE THAT THE VALUE ENGINEERING CLAUSES BE INCLUDED IN MAJOR SUB-CONTRACTS. SUB-CONTRACTORS MAY SUBMIT VALUE ENGINEERING CHANGE PROPOSALS TO THE PRIME CONTRACTOR. IF THE CHANGE CAN BE MADE WITHOUT GOVERNMENT



APPROVAL, THE PRIME AND SUB-CONTRACTOR SHARE THE BENEFITS IN ACCORDANCE WITH THE SUB-CONTRACT. THE GOVERNMENT WILL RECEIVE SOME BENEFIT WHEN THE NEXT PRIME CONTRACT IS AWARDED. FOR SUB-CONTRACTOR CHANGES THAT REQUIRE GOVERNMENT APPROVAL, THAT IS CLASS ONE CHANGES, THE SAVINGS FROM ACCEPTED PROPOSALS ARE SHARED IN ACCORDANCE WITH THE CONTRACT TERMS WHICH, IN TURN, ARE GUIDED BY THE FEDERAL ACQUISITION REGULATION.

THE DEPARTMENT HAS SET AN OVERALL VALUE ENGINEERING CHANGE PROPOSAL GOAL OF SEVEN TENTHS OF ONE PERCENT OF THE PROCUREMENT TOTAL OBLIGATIONAL AUTHORITY. THE SERVICES SET OTHER GOALS AS APPROPRIATE. FOR FISCAL YEAR 1985, THE SERVICES ACHIEVED 46 PERCENT OF THE OVERALL GOAL; WHILE IN FISCAL YEAR 1986 THEY ACHIEVED APPROXIMATELY 61 PERCENT.

IN FISCAL YEAR 1986, AN AVERAGE OF ONLY ONE OF THREE MAJOR PROGRAMS REPORTED ANY VALUE ENGINEERING SAVINGS ACCOMPLISHMENTS. TO IMPROVE THIS SITUATION, THE DEPUTY SECRETARY OF DEFENSE DIRECTED THAT THE VALUE ENGINEERING PROGRAM REQUIREMENT CLAUSE SHOULD BE APPLIED TO NON-COMPETITIVE INITIAL PRODUCTION CONTRACTS FOR MAJOR SYSTEMS IF THE CONTRACTOR HAD NOT PREVIOUSLY DEMONSTRATED AN EFFECTIVE VALUE ENGINEERING PROGRAM. WE ARE BEGINNING TO SEE SOME IMPROVEMENT. FOR EXAMPLE, THE ARMY REPORTED THAT ABOUT HALF OF ITS MAJOR PROGRAMS HAD VALUE ENGINEERING ACTIONS IN FISCAL YEAR 1986. THE ARMY ATTRIBUTES THIS IMPROVEMENT TO THE TEN MILLION DOLLARS PROVIDED AS ADDITIONAL VALUE ENGINEERING PROGRAM FUNDS IN FISCAL YEARS 1984 AND 1985 AND

A RESULTING INCREASE OF PROGRAM REQUIREMENT CLAUSES FROM 137 TO 575.

RATHER THAN CONDUCT SPECIFIC STUDIES OF MAJOR AND NON-MAJOR WEAPON SYSTEMS, THE DEPARTMENT OF DEFENSE ENCOURAGES THE USE OF THE VALUE ENGINEERING METHODOLOGY BY CONTRACTORS DURING THE DESIGN PHASE. DEPARTMENT OF DEFENSE COMPONENTS MAY INCLUDE THE VALUE ENGINEERING PROGRAM REQUIREMENT CLAUSE IN DEVELOPMENT CONTRACTS. THIS CLAUSE SERVES AS A VEHICLE TO PROVIDE DIRECTION AND FUNDS FOR CONTRACTOR VALUE ENGINEERING EARLY IN THE WEAPON SYSTEM LIFE CYCLE. LATER, AS THE PROGRAM CONTINUES INTO PRODUCTION AND DEPLOYMENT, VALUE ENGINEERING STUDIES MAY BE UNDERTAKEN AS TECHNOLOGICAL OR COST REDUCTION OPPORTUNITIES BECOME EVIDENT. WE BELIEVE VALUE ENGINEERING STUDIES EARLY IN THE WEAPON SYSTEM ACQUISITION PROCESS PROVIDE AN EXCELLENT RETURN ON INVESTMENT.

ONE AREA OF CONCERN IS THE INCENTIVE FOR SUB-CONTRACTOR VALUE ENGINEERING. THE FEDERAL ACQUISITION REGULATION PRESENTLY ALLOWS THE CONTRACTOR TO INCLUDE IN ITS ALLOWABLE COSTS ALL OF THE SUB-CONTRACTOR VALUE ENGINEERING CHANGE PROPOSAL DEVELOPMENT AND IMPLEMENTATION COSTS AND THE INCENTIVE PAYMENT TO THE SUB-CONTRACTOR. THIS IS TRUE ONLY FOR THE CONTRACT UNDER WHICH THE VALUE ENGINEERING CHANGE PROPOSAL HAS BEEN SUBMITTED. FOR CONCURRENT AND FUTURE CONTRACTS, THE INCENTIVE TO THE SUB-CONTRACTOR MUST BE PAID FROM THE CONTRACTOR'S SHARE BECAUSE THE CLAUSE STATES THAT ANY PAYMENT TO THE SUB-CONTRACTOR MAY NOT REDUCE THE GOVERNMENT'S SHARE. THUS, THE SUB-CONTRACTOR'S

INCENTIVE IS LIMITED TO SOME FRACTION OF THE CONTRACTOR'S SHARE. WE INTEND TO WORK WITH THE CIVIL AGENCIES TO CHANGE THIS CLAUSE TO INCREASE THE SHARE THAT CAN BE PAID TO SUB-CONTRACTORS AND PROVIDE TO THEM A GREATER INCENTIVE TO PARTICIPATE.

OUR COMPETITION INITIATIVE ALSO IMPACTS OUR VALUE ENGINEERING CHANGE PROPOSAL PROGRAM. AS WE INCREASE THE NUMBER OF CONTRACTS AWARDED TO TWO OR MORE SOURCES EITHER FOR COMPETITIVE REASONS OR TO MAINTAIN AN ADEQUATE INDUSTRIAL BASE, THE PROCESSING OF VALUE ENGINEERING CHANGE PROPOSALS BECOMES CONSIDERABLY MORE COMPLICATED. BOTH CONTRACTORS MUST COOPERATE IF THE CHANGE IS TO BE IMPLEMENTED EXPEDITIOUSLY AND EFFICIENTLY. THROUGHOUT THE DEPARTMENT OF DEFENSE, WE ARE BENEFITING FROM THE ARMY'S CONSIDERABLE EXPERIENCE IN IMPLEMENTING VALUE ENGINEERING CHANGE PROPOSALS IN ITS ARMAMENTS CONTRACTS WHICH ARE OFTEN DUAL SOURCE SITUATIONS. THE NAVY IS TESTING AN INNOVATIVE PLAN WHEREBY IT SHARES SAVINGS WITH BOTH OF THE SOURCES. THE AIR FORCE IS TESTING A VALUE ENGINEERING CHANGE PROPOSAL ACCEPTANCE PROCEDURE IN WHICH BOTH SOURCES AGREE IN ADVANCE HOW VALUE ENGINEERING CHANGE PROPOSALS WILL BE SUBMITTED, ACCEPTED AND NEGOTIATED. EFFORTS SUCH AS THESE ENSURE THAT THE CONCEPT OF ENCOURAGING CONTRACT CHANGE PROPOSALS THAT REDUCE OUR COSTS WILL CONTINUE TO FLOURISH IN A COMPETITIVE ENVIRONMENT.

THE FUNDS FOR CONTRACTOR VALUE ENGINEERING CHANGE PROPOSALS ARE PROVIDED FROM PROGRAM FUNDS AND ARE USUALLY BUDGETED ALONG WITH OTHER ENGINEERING CHANGE ACTIVITIES. IN ORDER TO ENSURE THAT

SUCH FUNDS ARE PROVIDED, A FORTHCOMING CHANGE TO THE DEPARTMENT OF DEFENSE BUDGET GUIDANCE MANUAL WILL STATE THAT CHANGE ORDER RESERVES BUDGETED IN THE PROCUREMENT TITLE ARE AVAILABLE FOR VALUE ENGINEERING AS WELL AS OTHER CHANGES. FOR OPERATION AND MAINTENANCE AND INDUSTRIAL FUNDED ACCOUNTS, THE GUIDANCE WILL BE CHANGED TO ALLOW FUNDS FOR VALUE ENGINEERING IN APPLICABLE EXPENSE LINE ITEMS. WE BELIEVE THIS NEW GUIDANCE WILL CLARIFY ANY CONFUSION THAT MAY HAVE EXISTED.

IT IS DEPARTMENT OF DEFENSE POLICY TO ENCOURAGE THE REUSE OF ALL OR PART OF THE BENEFITS FLOWING FROM VALUE ENGINEERING TO REDUCE RESOURCE REQUIREMENTS OR TO SUPPORT APPROVED BUT UNFUNDED REQUIREMENTS. THE FUNDS FREED BY VALUE ENGINEERING MAY BE USED BY THE PROGRAM OR COMPONENT DURING THE CURRENT YEAR AND DUE TO THE LENGTH OF THE BUDGET PROCESS, MAY BE AVAILABLE DURING THE BUDGET YEAR. DURING THAT TIME THE PROGRAM OR COMPONENT MAY ELECT TO REAPPLY SOME OR ALL OF THE FUNDS TO VALUE ENGINEERING OR TO ANY OTHER NEED. IN LATER YEARS, THE SAVINGS WILL BE CAPTURED IN THE BUDGET PROCESS AND THE PROGRAM OR COMPONENT WILL COMPETE FOR FUNDS IN ACCORDANCE WITH OVERALL DEPARTMENT OF DEFENSE AND LEGISLATIVE PRIORITIES. WE BELIEVE THIS PROCEDURE IS EQUITABLE AND OFFERS ADEQUATE INCENTIVE. WE DO NOT BELIEVE ANY CHANGE IS NECESSARY AND DOUBT THE PRACTICALITY OF TRYING TO SET ASIDE AND TRACK THROUGH THE BUDGET PROCESS, SAVINGS FROM PAST ACTIONS WHICH WILL ONLY BE MADE AVAILABLE FOR FUTURE VALUE ENGINEERING INVESTMENT.

IN HOUSE VALUE ENGINEERING PROPOSALS AND CONTRACTOR SUBMITTED

VALUE ENGINEERING CHANGE PROPOSALS MAY COVER ANY ASPECT OF DEFENSE ACTIVITY. ALTHOUGH MANY OF THE PROPOSALS ARE SUBMITTED AS PART OF A CONSTRUCTION OR WEAPON SYSTEM PROGRAM, OFTEN THEY APPLY TO ITEMS OTHER THAN HARDWARE. THERE HAVE BEEN APPROVED VALUE ENGINEERING ACTIONS FOR: REPAIR, OVERHAUL AND MAINTENANCE ACTIVITIES; OFFICE AUTOMATION; QUALITY CONTROL; FACTORY PROCESSES; AND OTHER ASPECTS. WE DO NOT LIMIT VALUE ENGINEERING ONLY TO HARDWARE BUT INCLUDE ALL ELEMENTS OF DEPARTMENT OF DEFENSE ACTIVITY SUCH AS SYSTEMS, EQUIPMENT, FACILITIES, PROCEDURES AND SUPPLIES.

VALUE ENGINEERING IS AN IMPORTANT ELEMENT OF OUR MILITARY CONSTRUCTION ACTIVITY. THE ARMY CORPS OF ENGINEERS BEGAN ITS PROGRAM IN OCTOBER 1964 AND REPORTED 2.3 MILLION DOLLARS IN SAVINGS. SINCE THAT TIME THEY HAVE REPORTED TOTAL SAVINGS IN EXCESS OF 1.5 BILLION DOLLARS WITH OVER \$160 MILLION IN FISCAL YEAR 1986. OF THIS TOTAL, TEN MILLION DOLLARS WERE FROM 294 CONTRACTOR VALUE ENGINEERING CHANGE PROPOSALS. THE OVERALL RETURN ON INVESTMENT FOR THE CORPS VALUE ENGINEERING PROGRAM IN 1986 WAS 34 TO 1. IN ADDITION THE CORPS HAS ORGANIZED A CONTINUING VALUE ENGINEERING STUDY TEAM. THIS TEAM, CONSISTING OF SIX PROFESSIONALS, WORKS THOSE VALUE ENGINEERING OPPORTUNITIES THAT HAVE BEEN IDENTIFIED AS HAVING THE LARGEST SAVINGS POTENTIAL AND GREATEST TECHNICAL COMPLEXITY. THE TEAM IS AVAILABLE TO ASSIST COMMANDERS WORLD-WIDE. ITS TASK IS TO DEVELOP DESIGN IMPROVEMENTS WHICH WILL RESULT IN QUALITY CONSTRUCTION AT REDUCED COST WITHOUT SACRIFICING SAFETY OR COMPROMISING PERFORMANCE. THIS SPECIAL TEAM HAS AVERAGED A RETURN ON INVESTMENT OF APPROXIMATELY 70 TO 1.

AIR FORCE CONSTRUCTION ACTIVITIES ARE TYPICALLY MANAGED BY THE ARMY OR THE NAVY. NEVERTHELESS, IN FISCAL YEAR 1986 THE AIR FORCE REPORTED \$34.7 MILLION IN SAVINGS FOR AN INVESTMENT OF \$3.2 MILLION, A RETURN ON INVESTMENT OF 11 TO 1. THE NAVY REPORTS SIMILAR SUCCESSES WITH ITS PROGRAM. THE NAVAL FACILITIES ENGINEERING COMMAND HAS BEEN A MAJOR CONTRIBUTOR TO THE NAVY'S VALUE ENGINEERING PROGRAM AND HAS PIONEERED THE USE OF CONTRACTOR RESOURCES TO CONDUCT VALUE ENGINEERING STUDIES OF NAVY CONSTRUCTION PLANS. FOR FISCAL YEAR 1986, THE NAVY FACILITIES ENGINEERING COMMAND REPORTED IMPLEMENTATION OF 2100 RECOMMENDATIONS FOR A TOTAL SAVING OF 148 MILLION DOLLARS. THEY ALSO APPROVED 73% OF THE 103 VALUE ENGINEERING CHANGE PROPOSALS SUBMITTED BY CONTRACTORS FOR AN ADDITIONAL SAVINGS TO THE NAVY OF ALMOST \$2.4 MILLION. SOME 75 PEOPLE WERE TRAINED. THE SAVINGS RESULTING FROM PROPOSALS GENERATED DURING THE TRAINING EXCEEDED THE COST OF THE TRAINING.

THERE ARE NUMEROUS COURSES IN VALUE ENGINEERING OFFERED TO DEPARTMENT OF DEFENSE CIVILIAN AND MILITARY PERSONNEL AND, WHEN SPACE PERMITS, CONTRACTORS AND SUB-CONTRACTORS. THE ARMY TEACHES A COURSE ENTITLED "PRINCIPLES AND APPLICATIONS OF VALUE ENGINEERING" WHICH IS DESIGNED FOR PRACTITIONERS. THE AIR FORCE OFFERS A COURSE IN THE "CONTRACTUAL ASPECTS OF VALUE ENGINEERING." TWO YEARS AGO, THE NAVY DEVELOPED A COMBINATION OF THE PRINCIPLES AND CONTRACTUAL ASPECTS COURSE FOR USE IN TRAINING MIDDLE MANAGERS. THIS COURSE IS OFFERED TO BOTH GOVERNMENT AND



CONTRACTOR PERSONNEL OVER FORTY TIMES A YEAR THROUGHOUT THE UNITED STATES. THE UPWARD TREND IN SAVINGS REPORTED BY THE NAVY IS AMPLE EVIDENCE THAT THIS INVESTMENT IN TRAINING IS PAYING AN EXCELLENT DIVIDEND.

TWO YEARS AGO THE ARMY ESTABLISHED AT THE ARMY MANAGEMENT AND ENGINEERING TRAINING AGENCY A NEW COURSE, "VALUE ANALYSIS FOR ADMINISTRATIVE AND SERVICE ACTIVITIES." THIS 40 HOUR COURSE IS ORIENTED TOWARD NON-INDUSTRIAL, AND NON-HARDWARE AREAS. EXAMPLES OF SOME OF THE AREAS EMPHASIZED INCLUDE OFFICE PROCEDURES, PAPERWORK FLOW, FORMS DESIGN, HOUSEKEEPING AND JANITORIAL TASKS, SNOW REMOVAL, PREPARATION OF TRAINING MANUALS, AND THE OPERATION OF ARMY TRAINING BASES AND FIRING RANGES. IN ADDITION, VALUE ANALYSIS OF COMPUTER SOFTWARE IS TAUGHT IN THIS COURSE.

THE DEFENSE SYSTEMS MANAGEMENT COLLEGE'S PROGRAM MANAGER COURSE CONTAINS A THREE-HOUR PRESENTATION IN VALUE ENGINEERING FROM THE PROGRAM MANAGER'S PERSPECTIVE. THE PRESENTATION PROVIDES PROGRAM MANAGERS AN UNDERSTANDING OF THE MEANS FOR ACHIEVING PROGRAM GOALS, BY USING A WELL MANAGED VALUE ENGINEERING ACTIVITY TO MAKE FUNDS AVAILABLE FOR REAPPLICATION.

ABOUT TWO YEARS AGO, THE DEPARTMENT OF DEFENSE EMBARKED ON A PILOT PROGRAM TO TEST THE UTILITY OF A DATA BASE OF ACCEPTED IN-HOUSE AND CONTRACTOR ACTIONS. THE DATA BASE IS CALLED THE VALUE ENGINEERING DATA INFORMATION STORAGE AND RETRIEVAL SYSTEM. WE HAVE A CONCERTED EFFORT TO BUILD THE DATA BASE AND IMPROVE THE

INDIVIDUAL SUBMISSIONS. THE DATA BASE IS INTENDED TO BE A USER FRIENDLY REPOSITORY OF SUMMARIES OF SUCCESSFUL IDEAS THAT MAY BE APPLIED ELSEWHERE.

IN 1982 WE ESTABLISHED A DEPARTMENT OF DEFENSE HONORARY VALUE ENGINEERING AWARDS PROGRAM. EACH DEPARTMENT OF DEFENSE COMPONENT IS ENCOURAGED TO SUBMIT A NOMINEE IN EACH OF FOUR CATEGORIES: COMMAND, PROGRAM MANAGER, CONTRACTOR AND INDIVIDUAL. IN 1984, WE ADDED A FIFTH CATEGORY, PROFESSIONAL. IN 1986, A SIXTH WAS ADDED, AN INSTALLATION CATEGORY, IN SUPPORT OF OUR MODEL INSTALLATION PROGRAM. EACH YEAR, THE WINNERS ARE INVITED TO A CEREMONY AT THE PENTAGON TO RECEIVE A LETTER AND PLAQUE FROM THE DEPUTY SECRETARY OF DEFENSE. CONTRACTORS, COMMANDS, AND INSTALLATIONS ALSO RECEIVE A PENNANT WHICH MAY BE FLOWN FOR ONE YEAR.

IN ADDITION TO HONORARY AWARDS, WE ENCOURAGE DEPARTMENT OF DEFENSE EXECUTIVES TO FURTHER REWARD THESE EXEMPLARY ACHIEVEMENTS THROUGH THE INCENTIVE AWARDS PROGRAM AND OTHER MEANS OF RECOGNITION. THESE MAY INCLUDE SALARY INCREASES, PROMOTIONS, OR BONUSES OR AWARDS. SIMILARLY, WE ENCOURAGE CONTRACTOR PLANS FOR GAINSHARING IN WHICH THE PRODUCTIVITY BENEFITS OF VALUE ENGINEERING ARE SHARED WITH THE EMPLOYEES WHO MADE THE GAINS POSSIBLE.

THIS MORNING I HAVE DESCRIBED FOR YOU THE DEPARTMENT'S VALUE ENGINEERING PROGRAM. WE SEE THOUSANDS OF PROPOSALS EACH YEAR IN THIS PROGRAM. PARTICIPATION IS BROAD. WE SEEK TO BROADEN IT

FURTHER. WE HOPE TO ENCOURAGE MORE CONTRACTOR PARTICIPATION. WE PROVIDE THE ENVIRONMENT, THE TRAINING, THE ENCOURAGEMENT, THE COMMITMENT AND THE INTEREST, AND WITH YOUR HELP, THE INVESTMENT FUNDS TO MAKE OUR PROGRAM A SUCCESS. WE BELIEVE NO FURTHER LEGISLATIVE MANDATE IS NECESSARY AT THIS TIME. OUR IN-HOUSE PROGRAM IS ON TRACK. AND THE FEDERAL ACQUISITION REGULATION PROVIDES AN ADEQUATE AND FLEXIBLE VEHICLE FOR OUR CONTRACTOR PROGRAM. I WOULD BE HAPPY TO ANSWER ANY QUESTIONS.



OFFICE OF FEDERAL  
PROCUREMENT POLICY

EXECUTIVE OFFICE OF THE PRESIDENT  
OFFICE OF MANAGEMENT AND BUDGET  
WASHINGTON, D.C. 20503

STATEMENT OF ROBERT P. BEDELL  
ADMINISTRATOR FOR FEDERAL PROCUREMENT POLICY  
BEFORE THE  
SUBCOMMITTEE ON OVERSIGHT OF GOVERNMENT MANAGEMENT  
OF THE  
COMMITTEE ON GOVERNMENTAL AFFAIRS  
APRIL 29, 1987

Mr. Chairman and Members of the Subcommittee:

I appreciate the opportunity to testify this morning. The Administration supports efforts to simplify the task of competing for Government contracts. We support not only the simplification of the procedure by which contracts are awarded and administered, but also the simplification of the contracts themselves. Expressing the Government's needs in functional terms, ensuring that no more than the Government's minimum needs are sought, and making certain that the most efficient procurement actions are pursued are priorities of my office.

Achieving these objectives brings predictable results: greater competition, lower costs, greater innovation, more productivity, higher quality, better products and a more viable private sector.

Value engineering is an approach to achieve many of these results, and it has been successfully used by the Government for many years. There are many formal definitions or descriptions of value engineering. A common element in most, however, calls for "a systematic analysis" of the functional requirements of systems, equipment, facilities, procedures, and supplies for the purpose of achieving the essential requirements at the requisite quality levels at the lowest overall total cost. In some instances, value engineering is used interchangeably with the terms value analysis, value control, value improvement or value management, and is sometimes referred to as just "good engineering." Value engineering, however, is more than just good engineering. It is a disciplined approach to cost cutting.

The objective of value engineering is to reduce unnecessary cost. It originated as a result of material shortages following War War II, and has since been applied successfully by both Government and industry. As a proven cost cutter, value engineering is important to Federal Government procurement. Federal Government procurement now exceeds \$200 billion every year. This is roughly one-fifth of the entire Federal budget. Spending this tremendous sum wisely is essential to the public's confidence in the integrity of the Federal Government.

To "buy smarter without sacrificing quality" — or while increasing quality — was one of the themes in the recommendations of the Commission on Government Procurement in 1972. This was also a finding in 1983 by the President's Private

Sector Survey on Cost Control (The Grace Commission), and, most recently -- in 1986 -- it was one of several key recommendations of the President's Blue Ribbon Commission on Defense Management (The Packard Commission).

Value engineering can and is helping us "buy smarter." In certain applications it has produced clear benefits. It is a proven cost cutting technique, one of many available to the engineering and procurement communities to help control cost. Like all tools, value engineering works best when properly used in certain circumstances by trained personnel. It is not a procurement panacea, but it is one technique that works in certain instances. There are costs associated with value engineering techniques and there are benefits. Value engineering must be viewed in the context of other ongoing efforts to reduce procurement costs. These efforts include:

- Streamlining the procurement regulatory development process;
- "Scrubbing" specifications, making greater use of functional descriptions, and eliminating redundancies and "goldplating;"
- Increasing the use of commercial products and standards;
- Rescinding and repealing unnecessary, duplicative and overburdensome regulations;
- Simplifying procurement procedures;
- Providing for appropriate schedule tradeoffs between costs and requirements;
- Improving planning, reducing "layering" and providing for short, clear lines of procurement authority and responsibility;
- Providing for more stable budgets and increasing the use of multi-year procurement authorities;



- Increasing the use of design to cost concepts and affordability reviews, and, last but not least,
- Increasing competition for Government contracts and assuring that contracts are awarded on the basis of best value, not merely lowest price.

The benefits of value engineering when properly applied are not in question. What is not settled is when to use value engineering, and how to make better, more cost effective use of it. This hearing should help answer these questions. My comments on these issues and the four matters referenced in your letter of invitation follow. Your questions are underlined. My answer to each follows.

Please comment on "OFPP's Role in Value Engineering in the Federal Government."

To the extent that value engineering efforts are accomplished through the procurement process, they are generally within OFPP's purview.

The Federal Government's policy on the use of value engineering is set forth in Part 48 of the Federal Acquisition Regulation (FAR). Part 48 provides two basic uses of value engineering. The first is an incentive approach in which contractor participation is voluntary and the contractor uses its own resources to develop and submit value engineering change proposals (VECPs). A contract clause provides that when such a VECP is accepted, any savings resulting therefrom are shared with the contractor on a preestablished -- usually a percentage -- basis set forth in the contract.

In the second approach, the Government requires in the contract -- and pays the contractor to conduct -- a specific value engineering effort, i.e., an effort to identify and submit to the Government methods for performing more economically. This effort generally is directed at the major cost items of a system or project, and can be particularly effective in reducing the cost of sole or limited source items.

While the FAR provisions are usually administered and maintained under the regulatory authorities of the Department of Defense, the General Services Administration and the National Aeronautics and Space Administration, OFPP also has responsibility for the overall FAR. Accordingly, if we determine that additional actions should be undertaken to further the use of value engineering through the procurement process, I believe that we have the authority to effectively direct that such actions be taken. This authority would, of course, be exercised in accordance with the existing statutory requirement (41 U.S.C. 420) to solicit and consider views from all interested parties.

Please comment on "Any assessments made by OFPP regarding the status of VE in the Federal agencies, including estimates of the potential for unrealized savings."

OFPP has not made a formal assessment of the status of the use of value engineering programs by the Federal agencies. Frankly, OFPP has not made assessments of many other worthwhile initiatives either. We hope that the President's appropriation request for FY 88 will permit us to do more. But now, besides my Deputy and OFPP's other senior executive, OFPP has only 12 professionals.

Our studies, therefore, have been limited generally to those required by Congress. While several studies have been required, e.g., Review of Spare Parts Procurements; Procurement of Professional Services, and Year-end Spending Practices, a study of value engineering has not been required or undertaken.

I understand, however, that over the last fifteen years, the General Accounting Office has issued 19 separate reports on the value engineering programs of various executive agencies and departments. These reports have been supplemented in recent years by reports prepared by the various Inspectors General. Apparently, value engineering has not gone unstudied. What we need now is to sort through this information. We need to determine what works and what doesn't work and why. And we need to identify any deficiencies in our policies and make appropriate adjustments.

Please comment on "The need for a mandated Government-wide VE program, either through legislation or by direction from OMB, with responsibility for the program housed in OMB."

I am reluctant now to endorse the need for either a legislatively or OMB mandated value engineering program beyond what is set forth in the FAR. I recognize and I am sympathetic to the need to encourage proper value engineering practices. However, the Department of Defense, the Department of Transportation and other major procurement and construction agencies have developed their own internal value engineering regulations. These regulations are tailored to their respective programs and procedures. As developers and

promulgators of Government-wide procurement policy, I believe our job is to ensure that Government-wide guidance and direction is provided where appropriate. The Government-wide policy must be specific, but it must permit the tailoring of implementing procedures to ensure that the agencies and departments have sufficient flexibility to apply the policies in an intelligent, cost effective manner.

Any other suggestions OFPP might offer as a solution to the inconsistent application of VE on a Government-wide basis.

Clearly, value engineering use differs substantially among the Government agencies. I do not find this to be surprising. Necessarily, the uses must be different because value engineering is most productive when the item sought is unique and large production quantities are bought. DOD, which buys large quantities of uniquely specified items, should have potentially the best opportunity to use value engineering. DOD also spends over 75 percent of the Government procurement dollars. Other agencies either buy predominately commercial off-the-shelf items or buy limited quantities. However, the differing conditions for value engineering application does not mean that improvement opportunities are not present.

OFPP will take several steps to determine if corrective actions are needed.

1. Review of Agency FAR Supplements.

One of our new initiatives is to survey regulations issued by agencies and departments that purportedly supplement the FAR. Our purpose is

to ensure that these regulations are necessary and that they do not unnecessarily paraphrase, duplicate or that they do not conflict with the FAR provisions. We will survey agency and departmental supplements on Part 48. We will look at the conditions established in the regulations for requiring value engineering reviews and seek to ascertain the reasonableness and the rationale for the conditions.

2. Pending FAR Cases.

We supervise the FAR development process. The Value Engineering Committee of the Defense Acquisition Regulatory Council (DARC) is considering two cases that could change the FAR. These cases involve:

- a. the development of criteria to assist contracting officers in determining when to include a mandatory value engineering effort that is priced and funded in contracts for major systems acquisition; and
- b. the allowability of costs for developing VECP's.

We will request the Chairman of the DARC to expedite the processing of these cases, with a view to encouraging more value engineering.

3. Promotion of the Value Engineering Change Proposals (VECPs).

The Department of Defense Inspector General concluded in a recent report that an important aspect of a successful value engineering program is support by program and procurement offices by visits to contractors, mailing of promotional and informational literature to contractors, and the holding of seminars for the purpose of informing

contractors about value engineering. DOD's IG determined that there was a positive correlation between the promotion of value engineering and the receipt of value engineering change proposals. Accordingly, we will consider adding provisions in the FAR that would require more aggressive promotion of value engineering.

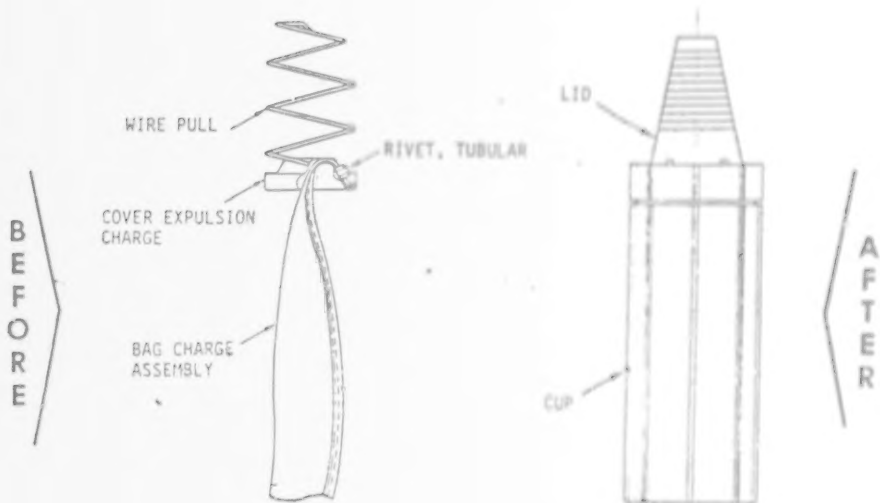
Mr. Chairman, that concludes my statement. I'll be happy to answer any questions.



EXAMPLES OF VE SAVINGS  
(Compiled by OGM Subcommittee Staff)

Expulsion Charge Assembly

DAY & ZIMMERMANN, INC. VECP KS-4012-154  
PLASTIC EXPULSION CHARGE ASSEMBLY  
FOR M483A1 - 155MM PROJECTILE



BAG  
ASSEMBLY \$4.52

PLASTIC CUP \$1.13  
ASSEMBLY

UNIT SAVINGS \$3.39

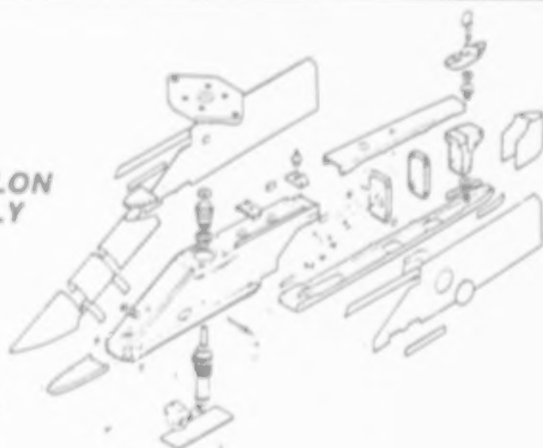
3 YEAR SAVINGS FOR THE US ARMY  
\$4,680,000

Redesign of Fuel Pylons

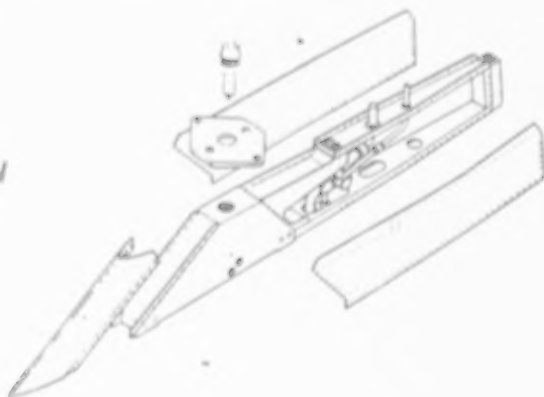
# VECP 0668

## REDESIGN OF FUEL PYLONS

---

**PRIOR TO VECP:****FUEL PYLON  
ASSEMBLY****PARTS REQUIRED FOR  
ASSEMBLY = 62**

---

**AFTER VECP:****FUEL PYLON  
ASSEMBLY****PARTS REQUIRED FOR  
ASSEMBLY = 24****TOTAL PARTS REDUCED = 38****TOTAL SAVINGS = \$20.8 MILLION**

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**HARDWARE  
VECP****GENERAL DYNAMICS**  
Fort Worth Division

4245.8-H  
Mar 86

1. TF 39 Engine Exhaust Nozzle Replacement

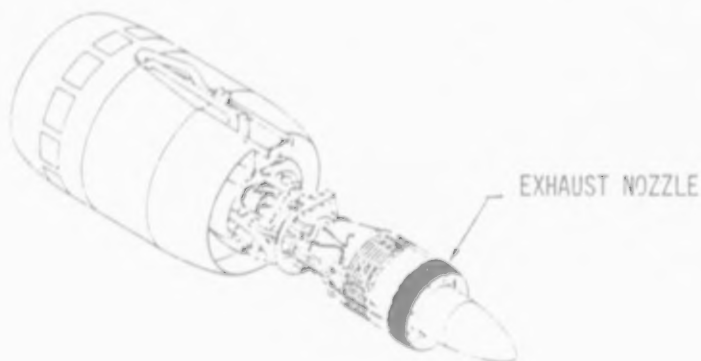
SAN ANTONIO ALC  
VALUE ENGINEERING (VE) PROJECT

SUBJECT: TF 39 ENGINE EXHAUST NOZZLE REPLACEMENT

BEFORE: \$1,141,885.00/YR WAS COST TO OVERHAUL AND REPLACE ENGINE EXHAUST NOZZLES WHICH SEEMED EXCESSIVE. A VE TEAM ANALYZED THE PROBLEM AND INITIATED TESTING ON NOZZLES PREVIOUSLY REMOVED FOR OUT-OF-TOLERANCE DENTS AND BULGES.

AFTER: STUDY AND ENGINE TESTING SHOWED ONLY 15% OF ENGINE THRUST GOES THROUGH THIS NOZZLE AND DAMAGE TOLERANCES COULD BE OPENED FROM .020" TO .50" WITH NO SIGNIFICANT EFFECT. THIS REDUCED FIELD REMOVAL BY 50% AND ALLOWED FIELD REPAIR OF MOST OF THE UNITS; THEREFORE, MOST OF THE EXPENSIVE DEPOT REPAIR WITH ASSOCIATED SHIPPING COSTS WAS ELIMINATED. PREVIOUSLY CONDEMNED NOZZLES COULD BE REWORKED AND RETURNED TO SERVICE. \*

SAVINGS: \$1,038,568.00 FIRST YEAR.



## II. C-5B Aircraft Landing Gear Brakes

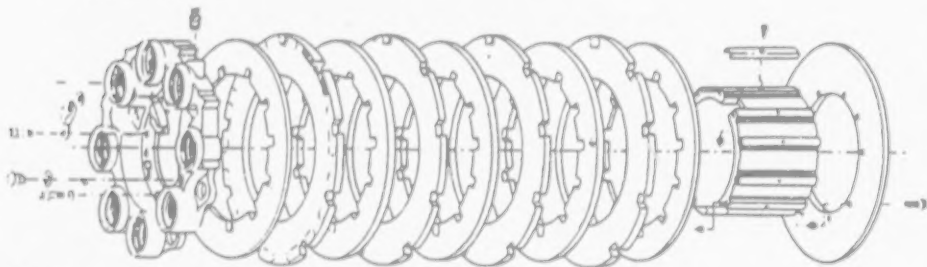
An example of a VE study done on the C-5B aircraft landing gear brakes for the U.S. Air Force is shown below. The VE study centered on the substitution of material, which realized a net savings to the Government of \$7,800,000.

### MLG WHEEL BRAKES

#### BEFORE:

C-5B AIRCRAFT LANDING BRAKES CONSTRUCTED OF BERYLLIUM MATERIAL

1. MATERIAL SERIOUS HEALTH HAZARD DURING REFURBISHMENT
2. HIGH COST MATERIAL
3. SPECIAL CLOTHING REQUIRED DURING HANDLING/REFURBISHMENT
4. 750 LANDINGS



#### AFTER:

C-5B AIRCRAFT LANDING GEAR BRAKES CONSTRUCTED OF SPECIALLY TREATED HARDENED CARBON MATERIAL

1. NO HEALTH HAZARD DURING REFURBISHMENT
2. LOWER MATERIAL COST
3. NO SPECIAL CLOTHING REQUIRED
4. SIGNIFICANTLY MORE LANDINGS

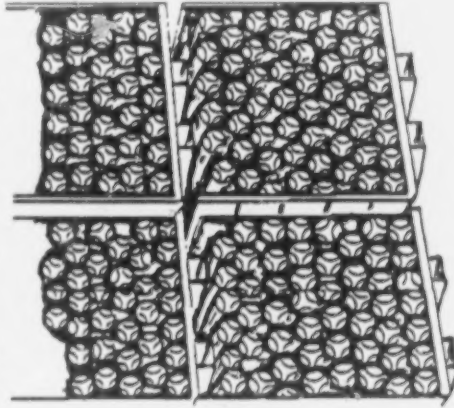
NET OVERALL SAVINGS TO THE GOVERNMENT - \$7,800,000

CONTAINER CRADLES  
VECP 867501

**BEFORE** PROPELLING CHARGE CONTAINERS INDIVIDUALLY  
STACKED.



**AFTER** CONTAINERS STACKED IN CRATES FOR FORK-LIFT  
HANDLING—MAJOR LABOR SAVINGS.



SOURCE: U.S. ARMY ARMAMENT, MUNITIONS & CHEMICAL COMMAND AND ICI AMERICAS, INC.

SAVINGS: FIRST YEAR - \$128,000

SECOND YEAR - \$168,000

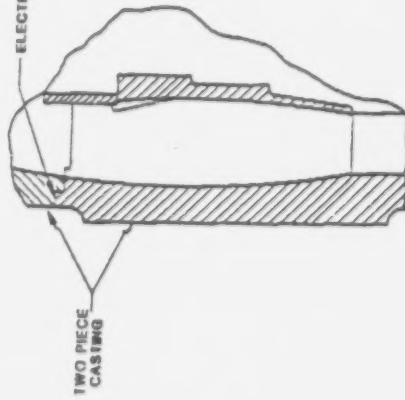
THIRD YEAR - \$432,000

## AIR DIFFUSER ASSEMBLY

VECP 845980

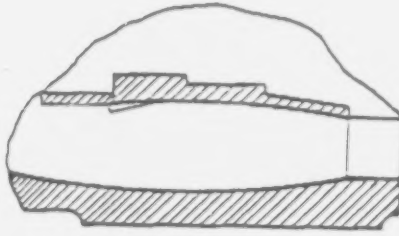
## BEFORE

TWO CASTINGS REQUIRED. EXPENSIVE ELECTRON BEAM  
WELD OPERATION REQUIRED. PRE-WELD MACHINING  
REQUIRED.



## AFTER

ONE PIECE INTEGRAL CASTING. MANUFACTURING TIME  
REDUCED BY ESTIMATED 7 HOURS SET-UP HOURS  
REDUCED BY ESTIMATED 13.7 HOURS.



SOURCE: U.S. ARMY TANK COMMAND AND AVCO LYCOMING DIVISION  
SAVINGS: FIRST YEAR - \$1,701,000

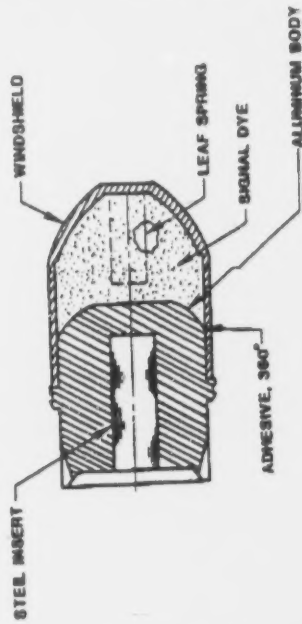
SECOND YEAR - \$1,701,000

THIRD YEAR - \$1,701,000



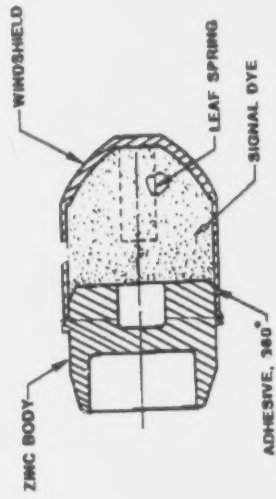
# CARTRIDGE BODY ASSEMBLY VECP 146104

**BEFORE** CARTRIDGE BODY ASSEMBLY CONSISTED OF ALUMINUM BODY AND STEEL INSERT.



**AFTER**

REPLACED CARTRIDGE BODY ASSEMBLY WITH A ONE-PIECE ZINC BODY HAVING SAME WEIGHT, C.G. & MASS MOMENT OF INERTIA. REDUCED FABRICATION AND ASSEMBLY COST.



SOURCE: U.S. ARMY ARMAMENT, MUNITIONS & CHEMICAL COMMAND AND MARTIN ELECTRONICS, INC.

SAVINGS: FIRST YEAR - \$136,000

SECOND YEAR - \$418,000

THIRD YEAR - \$215,000

### III. AN/TYC-39 Automatic Message Switch

The U.S. Army Communications and Electronics Command received and approved a VECF from the contractor to reduce life-cycle costs of the message switch for those applications not requiring a 50-line capability. This was achieved by replacing the existing dual shelter message switch with a single message switch, as shown below. While providing adequate communications capability, the single shelter message switch resulted in savings in equipment acquisition costs, training, maintenance, and operational needs.



#### VALUE ENGINEERING PROGRAM USACECOM AN/TYC-39 MESSAGE SWITCH

##### BEFORE



- 50 LINE DOUBLE SHELTER MESSAGE SWITCH
- TWO 5 TON TRUCKS
- 60 KW GENERATOR
- TWO TRUCK OPERATORS

##### AFTER



- 25 LINE SINGLE SHELTER MESSAGE SWITCH
- ONE 5 TON TRUCK
- 30 KW GENERATOR
- ONE TRUCK OPERATOR
- REDUCED MAINTENANCE
- FEWER SPARES
- REDUCED FUEL CONSUMPTION

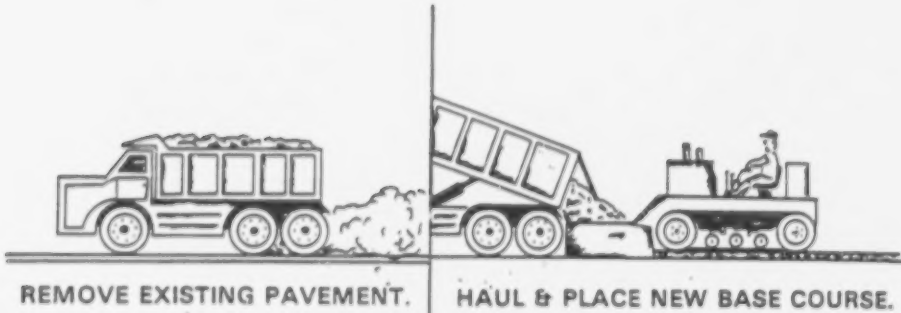
COMMUNICATIONS SYSTEMS DIVISION  
CITE PRODUCTS CORPORATION  
WETNAM HEIGHTS, MA

VECF TOTAL CONTRACT SAVINGS: \$1,994,000  
ROI — 12:1

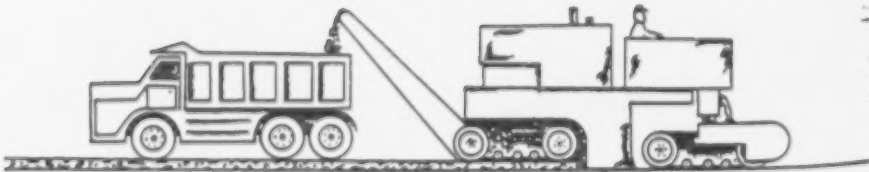
## X. Airfield Taxiway &amp; Apron

Project as designed called for complete removal and replacement of all existing taxiway and apron materials. The contractor's proposal recommended removing the existing asphalt pavement with a rota mill machine which grinds the material into pebble size granules. Then the recycled material is reused as base course material in lieu of purchasing and hauling in new base material.

## AIRFIELD TAXIWAY & APRON



**AS DESIGNED**



MILL EXISTING PAVEMENT AND REUSE FOR NEW BASE COURSE.

**ALTERNATE**

**SAVINGS — \$88,684**

OMB RESPONSE TO DEPARTMENT OF DEFENSE OFFICE OF INSPECTOR GENERAL AUDIT  
REPORT 85-055

Audit Report Number 85-055, "Inspection Procedures and Value Engineering Studies in the Real Property Construction Program" was issued by the DOD Inspector General on December 21, 1984. The value engineering section of the report contained the following recommendations:

1. We recommend that the Assistant Secretary of the Army (Civil Works), the Deputy Assistant Secretary of the Army (Installations and Housing), the Deputy Assistant Secretary of the Navy (Installations and Facilities) and the Deputy Assistant Secretary of the Air Force (Installations, Environment and Safety) establish annual value engineering savings goals for the Corps civil works program and the construction programs of the Military departments that are consistent with the average industry experience.

2. We recommend that the Deputy Assistant Secretary of the Air Force (Installations, Environment and Safety) direct that all Air Force installations participate in the DOD value engineering programs for construction and accept those value engineering recommendations that will reduce construction costs without impairing mission-essential capabilities on Air Force projects.

3. We recommend that the Army Chief of Engineers and the Commander, Naval Facilities Engineering Command fully implement sound value engineering programs for construction. Guidance should be provided to Corps districts and Naval engineering field divisions to:

a. Routinely identify, at the 35-percent design completion milestone, those projects with a potential for savings of five times or more the estimated cost of value engineering team studies that would determine the savings.

b. Perform value engineering studies for those projects identified as having sufficient potential savings. Document not only the savings needed to meet funding limitations but also all potential savings proposed by the study teams.

c. Document the reasons why rejected value engineering study recommendations are not accepted.

4. We recommend that the Army Chief of Engineers establish target dates for staffing all value engineering and study team leader positions in the Corps of Engineers with certified value specialists.

5. We recommend that the Army Chief of Engineers provide guidance to Corps districts to make value engineering studies and recommendations available to customers for decision at the time of the normal 35-percent design reviews.

This should minimize redesign costs for accepted recommendations and enable customers to better estimate construction costs before proposed projects are included in the DOD and civil works construction budgets.

The above recommendations were generally accepted by the respective services (Army, Navy and Air Force). Subsequent follow-up and monitoring of the implementation of the recommendations was performed by the Office of the Assistant Inspector General for Audit Follow-Up, DOD. This monitoring was completed on October 23, 1986 and as of that time the services were determined to be in substantial compliance with the recommendations and the report was "closed out."

DOD IG Audit Report Number 85-055 was forwarded to the Office of Management and Budget (OMB), but no OMB action was requested formally or informally. The Report was referred for "informational purposes" to OMB's National Security Division -- the budget Division responsible for DOD's budget.

The National Security Division and other OMB Divisions usually do not act on reports on individual agency or departmental programs unless action proposed by the affected agency or department would have a significant adverse budgetary impact. In this case because the audit recommendations were accepted and implemented, OMB did not become involved.

With regard to your concern about the Corps of Engineers not accepting value engineering recommendations for fully-funded projects, it is true that one of the general findings of the IG's report was that value engineering recommendations were more likely to be accepted on under-funded projects than on fully-funded projects. This was true for the Corps also, but they do not appear to be any worse in this regard than other services. It is important to have the decision makers' rationale for accepting or rejecting a value engineering reflected in the project files. The Corps, as well as the other DOD elements, have agreed to one of the audit report's main recommendations in this regard, i.e., to document project files and explain why any rejected value engineering recommendations were not accepted. This will assure that future decisions on rejected recommendations can be reviewed more easily and that such judgments will be subjected to more scrutiny. This should help ensure that decisions are not made due to funding availability.



A VALUE ENGINEERING PROGRAM AT A POLICY

LEVEL IN GOVERNMENT

Prepared by: William C. McElligott, PE, CVS  
Deputy Assistant Director

Researched by: Ms. Joyce Chang  
Public Information Coordinator for Value Engineering

New York City Office of Management and Budget  
Value Engineering Task Force

April 1987

## EXECUTIVE SUMMARY

The New York City Office of Management and Budget has used VE at a policy level since 1982 to control cost growth during the scope development and design phases of capital projects. For projects totaling over \$900 million, VE studies have resulted in over \$114 million in savings, with an additional \$24 million under review. OMB has invested only \$1.2 million into VE studies to achieve these results.

I. Benefits of Using at an Oversight Level

- VE program at an oversight level facilitates the implementation of cost saving recommendations.
- VE program at an oversight level insures that the program is not in competition with other needs of an agency.
- VE program at an oversight level can impact citywide practices and procedures.
- VE program at an oversight level can question why a project is worthwhile, instead of looking only at how it is being designed.
- VE program at an oversight level coordinates the project's development.

II. Elements for a Successful VE Program

- Top management support
- Full-time program
- Access to necessary expertise and information for a project.
- Project selection criteria, concentrating on the most cost-intensive projects early in design.

III. Results of VE Studies

- Realistic budgets due to the use of independent cost estimates.
- Modifications in space requirements, design, and construction leading to project improvements and reduced costs.
- Updating standards and equipments for improved efficiency and reduced costs.
- Reductions in future operating costs, because staffing issues drive the design.
- Improvements in safety, security, design, and aesthetics.

IV. Future Initiatives

- Supplemental in-house VE program.
- Multi-project studies.
- Independent agency VE units.
- Evaluation of equipment purchases.
- Changes in City procedures and standards policies.

## Outline - Value Engineering at a Policy Level in Government

## I. Introduction

- A. How and why OMB decided to use VE
- B. Benefits of having a VE program at an oversight level
- C. How NYC OMB's program differs from other VE programs
- D. Problems in the capital process without VE

## II. Project Selection Criteria

- A. Need for top management support
- B. Concentrate on most cost-intensive projects early in design
- C. Guidelines for identifying potential projects

## III. Development of realistic project budgets

- A. Use of independent cost estimates to set budgets
- B. Example of projects

## IV. VE identifies and removes unnecessary costs, both capital and operating costs

- A.
  - i. Modifications in space requirements
  - ii. Modifications in design and construction
  - iii. Updating building standards and upgrading equipment

## B. Operating Costs

- i. Uses design phase as the one time opportunity to impact lifecycle costs
- ii. Staffing issues drive the design

## V. Improving designs so that required functions are properly provided for

- A. Improvements on safety, security, design, and aesthetics
- B. Improvements in efficiency
- C. Standards studies

## VI. Improvements in the planning process

- A. Team effort avoids adversarial relationship between OMB and City agencies
- B. VE study includes everyone whose input is crucial for a project

## VII. Future Initiatives

- A. Program Growth
- B. Supplemental in-house VE program
- C. Multi-project studies
- D. Independent agency VE units
- E. Equipment purchases (e.g. fire trucks, sanitation vehicles)
- F. Changes in City procedures and standards

Abstract

The New York City Office of Management and Budget (OMB) has used VE since 1982 at a policy level to control cost growth during the scope development and design phases of capital projects. This paper explains how the application of VE at a policy level in government facilitates the implementation of cost saving recommendations. The paper further illustrates how the converse is also true. VE has improved decision-making at OMB. Although OMB has focused on cost savings, all of the completed VE studies have also resulted in project improvements since all levels of City agencies have participated in decision-making, and the elimination of costs has permitted the inclusion of facility enhancements.

Introduction

The New York City Office of Management and Budget (OMB) administers a \$2 billion/year capital program, and handles 3,500 capital construction projects in the City's four year financial plan. When cost overruns occur on even one project, the media is quick to criticize city government. To prevent cost overruns, VE was first used at OMB in 1982 when the City was starting a major jail construction program. Because of the size of the proposed jail program, OMB's Correction Unit was asked to look for a cost containment method used by other major builders.

VE was selected, and its effectiveness on two jail projects far exceeded OMB's expectations. On the first jail study, a new, 500 cell facility to be built in the lower Manhattan Civic Center, the VE study resulted in the elimination of sixty operating staff positions and 66,000 gross square feet (1.5 acres), while still providing the same functions. The estimate for the jail after the study was \$4.4 million under its allotted budget. Before the VE study, the jail was \$11.1 million over budget. Because of the success of the first study, another VE consultant was hired to review the program of requirements for a second new jail facility. In 1984, a separate VE task force was established in OMB to incorporate VE into the OMB review and approval process citywide. The decision to operate the VE program at OMB has proven to be very beneficial to both the VE program and the budgeting process.

OMB investigated cost containment methods in both the public and private sector, and found value engineering to be the most effective technique. VE is recognized internationally for improving projects and lowering costs. Since 1954, 15 federal agencies including the Environmental Protection Agency and Defense Department have used VE. Nine state governments have applied VE in their districts on a variety of projects. In 1982, the President's Private Sector Survey on Cost Control Task Force (Grace Commission) recommended that federal agencies consistently use VE in all districts and divisions.

In the private sector, corporations such as General Electric, General Motors, AT and T, Union Carbide, and Ciba Geigy have established VE programs. There are practicing value engineers in companies in Japan, India, Sweden, France, and England. Of the top 20 Japanese industrial firms, 17 have VE executives at the vice-presidential level. Hitachi alone employs 250 value engineers, and Korea is now interested in VE.

VE studies produce good ideas; however, good ideas alone are not enough to produce change. The creation of a new idea by itself is not enough. Mechanisms to implement that idea are also necessary. In government, good ideas usually have to pass through a long series of bureaucratic hurdles to reach the decision makers. This process is usually so onerous that it actually discourages even the generation of new ideas. Implementing new ideas is an uphill process, and for the most part the odds for success are not favorable.

The fact that OMB is part of the Office of the Mayor, in a policy making position, allows the VE program a number of advantages which most other government VE programs do not enjoy. Since OMB, decides that a VE study is necessary, good ideas are actually implemented because OMB is an oversight agency. Ideas are not discounted unless there is a legitimate reason which can be documented. The odds for succeeding are enhanced because OMB can short circuit government bureaucracy. As a result, every good VE proposal is included at the decision-making level since that is where it originated to begin with. Furthermore, after the VE proposals have been accepted, OMB also



facilitates their implementation. In City government, making changes is normally never an easy task, but it is much easier when the authority of the City's chief executive serves as the driving force behind an idea. Pushing an idea through a government system from the top down is much simpler than working from the bottom up.

New York City OMB is unique in applying VE at an oversight level. Most federal agencies incorporate VE as part of a design review after policy decisions have already been made on a project. VE at the policy level allows the greatest opportunity to affect change because a VE study can question why a project is worthwhile, rather than simply examining how a project is being designed and constructed. OMB has found that the cost of these reviews has a high payback should a project prove to be undevelopable or superfluous as designed.

However, establishing a VE program, in it itself, does not assure an effective approach to cost control. Value Engineering programs are most successful when there is top management support for the program. A 1984 General Accounting Office study of federal agencies using VE reported that the most critical element of assuring success is to obtain top management support. Similarly, the National Research Council, which serves the National Academy of Sciences and the National Academy of Engineering, characterized successful VE

programs as including top management support, a full-time staff, and procedures to assure implementation of approved VE recommendations. OMB's program includes all of these characteristics.

These aspects of OMB's VE program are evident in virtually every step of the VE process. An oversight VE program is not in competition with other needs of an agency. Since OMB has a full-time VE technical staff and numerous VE firms under contract on a task order basis, the VE team does not need to detract from resources in an agency to conduct a study. OMB's full-time staff assures that projects can be studied thoroughly before a study and that team members are present during the entire study. In addition, VE project managers assure that recommendations are implemented after a study.

When OMB selects a project for inclusion in the VE program, VE automatically becomes a required part of the funding approval process. When a VE study is initiated, OMB can then reach into a City agency to select all in-house experts whose input is crucial for a successful study.

After the study is completed, those individuals who will collectively determine the final outcome of each VE recommendation are brought together at an OMB-sponsored implementation meeting. This meeting, in effect, places every decision in a fish bowl which makes it virtually impossible to dismiss a good recommendation without a completely valid reason. The final step is making sure that recommendations which were agreed upon are successfully implemented. This responsibility remains within the jurisdiction of OMB's VE task force. The VE task force follows-up and insures that whatever needs to happen to implement a recommendation does in fact take place.

Sometimes all that is necessary for successful implementation is periodic checking to keep a project on track, but at times, it is necessary to use OMB's influence: to initiate a review of existing standards, procedures or policies; or to intercede with one of the City's regulatory agencies; or even to have necessary legislation drafted. On occasion, the VE task force has even interceded within OMB for a project, if the VE review concludes that a funding adjustment is needed. The adjustment could involve both increasing funds as well as reducing them. At times a VE study will include recommendations which result in greater costs during design, but lower operating and maintenance cost over a project's lifecycle.

The VE study also develops standards for project management whenever possible, including time schedules to insure that a project is constructed without delay and cost overruns. This is possible because VE studies simplify complicated projects into a few basic issues, and force people to concentrate on one task at a time. Due to the magnitude of capital projects and because capital projects can span a period of several years, project schedules are not normally jointly set by OMB and City agencies. The VE team makes efforts to tie project milestone points to a time frame, and coordinates the work effort on a project.

Project Selection Criteria

Top management support is essential for a successful program; however, an effective VE program needs not only the support of top management but project selection criteria and effective implementation procedures. Not every capital project is a suitable for value engineering. VE programs should choose projects selectively, and focus on projects that are most susceptible to VE.

OMB's VE unit recently completed an analysis of the four-year capital program to identify potential projects. The analysis reflects Pareto's law of selective control, and indicates that there are relatively few projects which comprise the majority of costs. VE efforts should be concentrated on these selected projects.

Cost and project size are generally good indicators of the potential for VE savings. The VE unit decided to focus on only the most cost-intensive projects for future studies, capital projects with total costs of \$5 million or more. Although there are over 3,500 capital projects in the City, the analysis identified only 600 projects over \$5 million. Furthermore, the analysis found that approximately 16% of the projects account for 31% of the capital budget or approximately \$12 billion out of the total \$15.7 billion capital budget. By focusing VE on these projects, VE will be able to impact the majority of the City's capital budget.

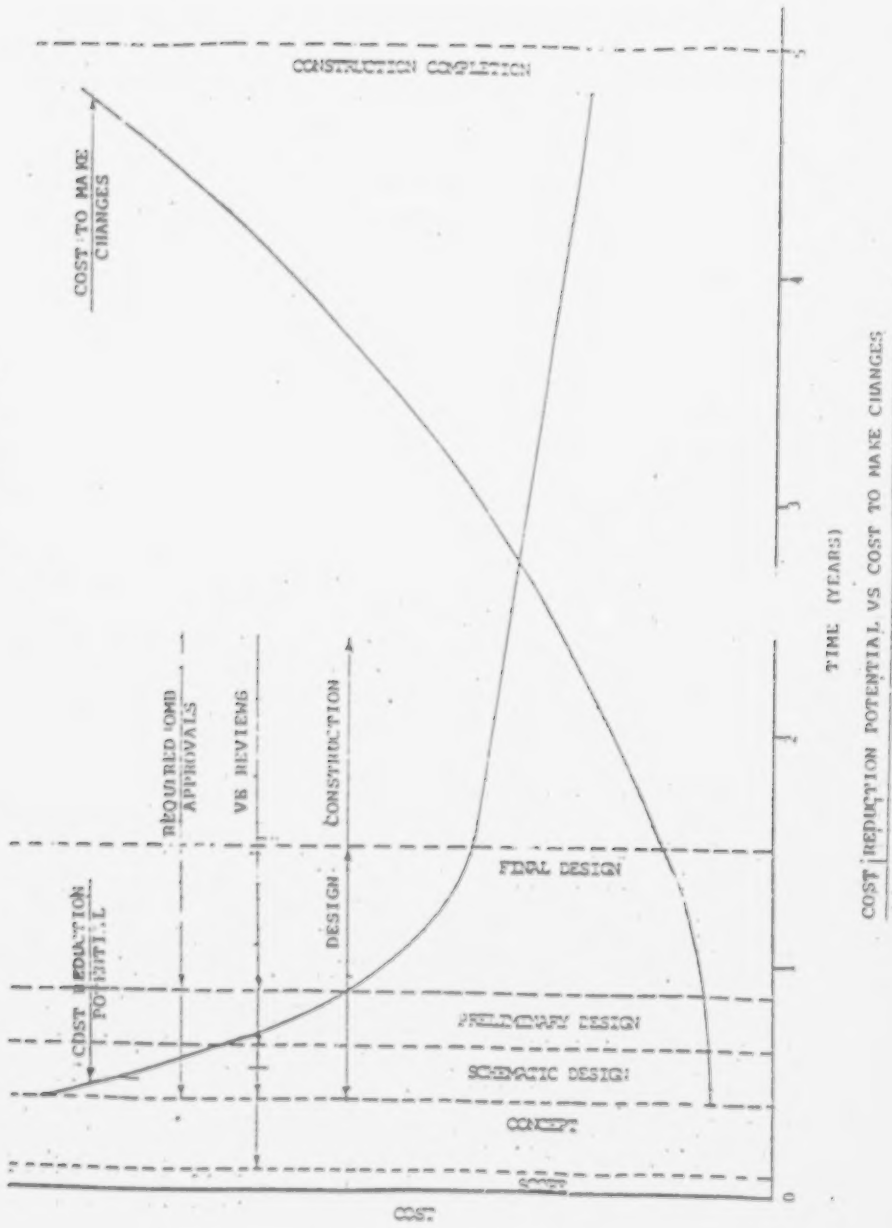
OMB has developed the following guidelines for identifying potential projects:

- Projects involving expenditures of at least \$5 million, with priority given to projects that are over \$10 million.
- Designs which are over budget in the City's commitment plan and need to be brought back to budget.
- Projects which are early enough in design to develop recommendations which can be implemented.
- Repetitive projects for prototype studies, which may be small individually, but are routine and recurring in nature, and collectively large (i.e street, sewers, window replacements).
- Projects for which a standard could be developed (i.e., firehouses, police precincts).
- Designs with a high degree of complexity.
- Designs that utilize the most advanced technology.
- Designs utilizing older technologies for which modernization appears very promising.

OMB has found that VE is not appropriate for projects which are too small in size or cost and for projects which are too late in design to implement recommendations without seriously delaying a project. From past experience, the optimal time to conduct a VE study is during the schematic design (when scope has been translated into early lay-out) stage when projected costs have been set by the involved design and operating agencies, and the scope of work is ready to be analyzed as well. The VE effort at OMB is usually concentrated during the first 30% of the design process since the early identification of problems permits informed management decisions and allows time to implement viable solutions.

Changes to design can be made most easily during the earliest phase of the design process. At the conclusion of the study, a project budget is determined that incorporates the accepted VE recommendations. Studies are then performed at various points during the design to assure compliance with the agreed upon scope and established budget.

The following graph illustrates the potential cost savings for a project during design vs. the cost to make changes:





While the emphasis has been placed on how VE thrives in an upper management setting, the converse is also true. VE improves the budgeting process. The VE study establishes a clear understanding of the project which helps to set an accurate budget that takes future operating costs into consideration. Results so far show how OMB's VE program is helping OMB:

- I. To develop realistic project budgets,
- II. To identify and remove unnecessary costs, both capital and operating,
- III. To improve designs so that required functions are properly provided for, and
- IV. To improve the planning process

## I. DEVELOPMENT OF A REALISTIC PROJECT BUDGET

OMB has found that it is not unusual for City agencies to present OMB with estimates of project costs which are *overly optimistic*. Therefore, OMB conducts independent estimates of costs, prepared by professional cost estimators, as part of every VE study. The identification of cost problems at an early stage in project development permits the inclusion of essential remedial measures while it is still possible to modify the design without seriously upsetting the project's advancement. This aspect is particularly important for VE studies during the scope development stage of a project.

For example, the New York City Health and Hospital Corporation (HHC), which runs the largest public health care system in the country, agreed that the VE estimate of \$185,000,00 on a major hospital in Queens, better reflected the project's costs rather than their own estimate of \$162,000,000. The more accurate estimate pointed out that the project was already seriously over budget. With the assistance of the VE team it was possible to modify the project's scope and bring it back to budget. Similarly, VE developed a more accurate cost estimate for a proposed citywide computer network. The VE study revealed that the initial staff required would need to be expanded to 67 rather than the agency's original estimate for 30 to 35 staff members.

On one VE project studied in FY'86, the modernization of the Times Square subway complex, the VE study revealed that the agency had underestimated the cost of the project by \$35,000,000. The new estimate raised questions at the policy level which had never been addressed before the study. An example of

this is that prior to the study, the likelihood of remedial work in existing structures had not been addressed. The more accurate cost estimate caused the City to reopen negotiations with the developer of the adjacent office towers, which resulted in an increase in his contribution to the subway project.

The VE review assures the inclusion of all needed program elements and thus prevents "scope creep." "Scope creep" occurs when missing items in a design are discovered late in a project's development, resulting in costly changes and additions to design. The cost estimator, because he can obtain assistance from experts on the VE team, is better able to put together an accurate cost estimate. In the past, when inaccurate cost estimates were discovered, it was necessary to either cut out whole parts of a building or increase the budget.

O&B effectively uses the VE review to help it set project budgets at the outset of the project. This helps to maintain a strict budget which the project must adhere to right from the start and helps to avoid expensive and lengthy redesign if changes have to be made in a project's design to stay on budget. Project budgets based on unrealistic estimates precipitate enormous problems throughout the design and construction process. When an original budget is proven to be clearly unrealistic, at a late stage in project development, there are no simple solutions. At best, a costly delay results while the sponsoring agency tries to obtain additional funding. At worst, everyone in City government connected with the project is criticized for mismanagement.

II. IDENTIFYING AND REMOVING UNNECESSARY COSTS,  
BOTH CAPITAL AND OPERATING

To date, OMB has performed VE studies on 17 projects, ranging from a \$1.5 million prototype design of a mini-school, to a citywide computer network, to a \$150 million hospital reconstruction. The total estimated cost for these 17 projects was over \$900 million.

The total value of implemented VE recommendations amounts to over \$11: million, and it is expected that \$24 million of additional VE recommendations, which are still under study, will also be implemented. In addition, other VE recommendations have been implemented which will substantially reduce future operating costs for these facilities. Since OMB has spent only \$1.2 million for the related consultant services to achieve these savings, the return on investment has been immediate.

Monetary savings have been achieved through modifications of facility space requirements, design and construction modifications, updating building standards, and upgrading equipment.

Modifications in facility space requirements and construction materials have been responsible for the largest share of capital savings in VE studies. In many designs, the program allocating space does not meet the project's real needs or is used inefficiently. The VE study at the scope stage analyzes the functional requirements of construction projects and recommends space adjustments and design changes which do not detract from essential functions.

For example, a recent VE study on the proposed design of the hospital reconstruction project in Queens which was over budget, developed space reductions and layout recommendations that were implemented into the next phase of design. These changes represented almost \$24,000,000 in savings. During the VE review, space was reduced and unnecessary space was eliminated in areas where it would not affect patient care. The VE study also produced recommendations which will reduce the inconvenience to staff operations, and will allow more of the hospital to operate during construction. Operations staff attended the workshop and proposed many of the changes which increased the hospital's efficiency and saved money. Without the VE study, entire departments included in the hospital modernization might have been eliminated to stay within the city's budget.

Similarly, modifications in construction materials have not only saved money, but have also improved a project's operations. The VE study on the renovation and expansion of LaGuardia Community College included a recommendation to use an alternative facade treatment in harmony with the adjacent building. This modification resulted in \$750,000 in savings. On a recent design for a zoo reconstruction, decorative granite work has been replaced with precast concrete and will have a minor aesthetic impact. This change produced savings of \$653,000, and the substitution will not affect the construction or operations of the zoo.

On many projects, projected annual operating costs are equal to or far exceed annualized capital costs. Lifecycles costs are addressed during design but usually they are not stressed. For staff intensive projects such as jails where the ratio of inmates to staff is 2:1, future operating costs issues

should override most other issues. During a project's scope and design phases, the greatest opportunity exists to change designs which can impact lifecycle costs. VE takes advantage of this unique opportunity by focusing on this phase of development to address future operating costs. The VE study forces a tighter design and staffing issues are identified and solved early, rather than being addressed when the building is complete.

On a lower Manhattan jail which was value engineered in 1982, the VE study addressed the building configuration and staff organization. As a result of the study, the need for 66 full-time positions was eliminated. This was accomplished by taking advantage of the fact that the new jail will be adjacent to an existing jail. The new jail is being constructed so that it will be possible for the two jails to share a kitchen, health facilities, inmate processing and maintenance. These design modifications resulted in future operating cost savings of about \$2,000,000 per year. The latest estimate of operating and maintenance costs for the jail is \$8.9 million per year. Hence, the VE recommendations resulted in over a 20% reduction in lifecycle costs.

A second jail project, a new facility for women on Riker's Island, achieved even more impressive cost savings because of VE. By changing the configuration of the housing units, it was possible to eliminate the need for 100 correction officers for a future operating cost savings of \$3,200,000 per year.

Finally, VE studies have identified ways to improve projects and avoid costs by updating the City's building standards and proposing the use of state-of-the-art equipment, thus changing the construction process at a policy level for the entire city.

In a study on a swimming pool reconstruction, the installation of a state-of-the-art, high-rate water filtration system was permitted after a code variance was obtained. This will save the City close to \$500,000 on this project alone, and will provide additional savings as other city pools are upgraded. Cutting costs to stay within funding constraints is usually a painful process. However, the swimming pool project is one example of how VE is changing the capital budgeting process and using the influence of the budget office to improve a project and increase its value.

The following list of all 17 projects summarized the success of VE at New York City's Office of Management and Budget:



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VALUE ENGINEERING CAPITAL SAVINGSTHROUGH FIRST QUARTER FY97

(DOES NOT INCLUDE ANNUAL OPERATING OR DEBT SERVICE COST/SAVINGS)

| <u>Projects</u>                                        | <u>Total<br/>Project Cost</u> | <u>Capital<br/>Savings</u> | <u>Cost of VE<br/>VE Consultant</u> |
|--------------------------------------------------------|-------------------------------|----------------------------|-------------------------------------|
| White Street Jail                                      | \$82,600,000                  | \$21,644,000               | \$170,000                           |
| East Facility Jail                                     | 94,100,000                    | 9,124,000                  | 101,000                             |
| Police Plaza Reconstruction                            | 7,700,000                     | 4,781,000                  | 42,000                              |
| Fresh Kills Barge Unloader<br>and Landfill Development | 250,000,000+                  | 38,366,000                 | 130,000                             |
| Central Park Precinct<br>Reconstruction                | 4,800,000                     | 659,000                    | 24,000                              |
| Astoria Pool Reconstruction                            | 21,700,000                    | 4,430,000                  | 64,000                              |
| LaGuardia Community College<br>Expansion               | 89,100,000                    | 2,750,000                  | 78,000                              |
| Elmhurst Hospital<br>Modernization*                    | 185,700,000                   | 23,705,000                 | 70,000                              |
| 41st Police Pct., Bronx -<br>New Facility              | 9,200,000                     | 1,189,000                  | 14,000                              |

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| <u>Projects</u>                                    | <u>Total</u><br><u>Project Cost</u> | <u>Capital</u><br><u>Savings</u> | <u>Cost of VE</u><br><u>VE Consultant</u> |
|----------------------------------------------------|-------------------------------------|----------------------------------|-------------------------------------------|
| Rescue 1 Firehouse - New Facility                  | 2,800,000                           | 112,000                          | 14,000                                    |
| NYC Aquarium - Sea Cliffs Expansion (New Exhibit)  | 17,600,000                          | 1,928,000                        | 50,000                                    |
| Prospect Park Zoo Reconstruction                   | 29,300,000                          | 2,900,000                        | 70,000                                    |
| Mini-School Prototype                              | \$1,700,000                         | \$148,000                        | \$35,000                                  |
| Carpenter Avenue Area Street Reconstruction, Bronx | <u>19,000,000</u>                   | <u>2,400,000</u>                 | <u>60,000</u>                             |
| Finalized Subtotal                                 | \$814,300,000                       | \$114,136,000                    | \$922,000                                 |

| <u>Additional Savings</u><br><u>Under Review</u> | <u>Total</u><br><u>Project Cost</u> | <u>Capital</u><br><u>Savings</u> | <u>Cost of VE</u><br><u>VE Consultant</u> |
|--------------------------------------------------|-------------------------------------|----------------------------------|-------------------------------------------|
| City Net Data Network                            | 21,600,000                          | 2,000,000                        | 140,000                                   |
| Times Square Subway Station Modernization        | 85,600,000                          | 9,069,000                        | 170,000                                   |

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| <u>Additional Savings</u>    | <u>Total</u>        | <u>Capital</u>    | <u>Cost of VE</u>    |
|------------------------------|---------------------|-------------------|----------------------|
| <u>Under Review</u>          | <u>Project Cost</u> | <u>Savings</u>    | <u>VE Consultant</u> |
| P.S. 269, Brooklyn, Addition |                     |                   |                      |
| and Renovation               | 8,300,000           | 331,000           | 14,000               |
| Elmhurst Hospital            | (Incl. above)       | <u>12,850,000</u> | (Incl. above)        |
| Under Review Totals          | \$115,500,000       | \$24,250,000      | \$324,000            |
| GRAND TOTALS                 | \$929,900,000       | \$138,386,000     | \$1,246,000          |

\*Indicates projects with additional savings under review

### III. IMPROVING DESIGNS SO THAT REQUIRED FUNCTIONS ARE PROPERLY PROVIDED FOR

The achievement of cost savings has been emphasized; however, most of the completed VE studies have also resulted in project improvements. Results of the completed studies have frequently exceeded expectations. Improvements in safety, security, design, and aesthetics, typical results of VE studies along with cost savings, are important to OMB because they improve the delivery of required project functions.

A VE study on a children's zoo in Brooklyn recommended safety improvements to remove asbestos from several buildings and recommended changing the loading dock roof from glass to metal. The VE study also improved the effectiveness of the planned exhibits by improving "hands-on" educational devices which will explain the exhibits in greater detail.

The reallocation of space in the hospital mentioned earlier, increased the efficiency of operations. Since the hospital operating staff was involved on the project, the VE team was able to work with them to develop tactics to reduce the inconvenience of construction to the operating staff and the public. The VE recommendation to construct a free-standing building for a portion of required new space, rather than in-filling wings of the hospital, reduced costs as well as the impact of construction on hospital operations. This design change also decreased revenue loss which would have resulted if more of the hospital had to be shut down during the construction.

Similarly, the addition of the high-rate water filtration system on the swimming pool project increased the efficiency of operations. New York City swimming pools were using outdated, slow-rate filters because of Health Department requirements. The VE project manager was able to negotiate with the Health Department and received approval to install state-of-the-art equipment which will not only save money but also improve efficiency.

VE studies often go beyond simply improving the projects which are studied. Studies also have the potential to improve services citywide. Past studies have identified standard practices and policies which could be simplified and updated to improve overall efficiency. Approximately half of New York City's capital projects are repetitive type projects governed by standards, including projects such as firehouses, police precincts, schools and street improvements, and sewer and water main projects.

The first VE standards and procedures study was conducted for the Department of Transportation last year. A street reconstruction project of 23 streets in the Bronx was selected by OMB as being typical of a significant percentage of the Bureau of Highway Operation's planned reconstruction projects. The study examined ways to improve operations, control drainage, and enhance appearance. Since the Department of Transportation's capital projects total over \$400 million/year, the impact of this VE study will have a far reaching effect on a broad range of projects.

The VE task force plans to work on ways to reduce the time it takes for a street rehabilitation to progress from inception to construction. The VE unit anticipates that a study of design standards, procedures and policies might cut at least one year off of the process by coordinating and simplifying project development.

## IV. IMPROVEMENTS IN THE PLANNING PROCESS

Because OMB, in its normal capacity, serves as a monitor and one of the chief critics of agency operations, there is a natural antagonism between agencies and OMB. However, VE departs from the adversarial relationship between OMB and City agencies by working as a team to reduce costs and develop project improvements. OMB's VE program is changing the capital budgeting process by bringing together as a team for the first time, everyone whose input is important to a project's development. VE's vigorous work plan to identify unnecessary costs and to improve project functions compels in-house and outside experts to look beyond their own sphere and consider the impact of each decision on the total project.

VE avoids the adversarial relationship which has traditionally existed between the budget office and City agencies because it is essentially a positive process. Since the goal of a VE study is not simply to cut costs but to increase value, OMB's VE studies frequently identify necessary facilities which are not being adequately provided for. Often, project improvements have resulted because the elimination of unnecessary costs has permitted the inclusion of a number of facility enhancements. Since identified savings greatly outweigh the cost of enhancements, OMB can almost always include project improvements, and still stay within the budget. As a result, feedback from the project sponsors regarding these studies has been mostly positive.

The success of a planning process depends to a large degree on the coordination of information from people at all levels in an organization. Because an OMB VE study provides a mechanism for ideas from the bottom and all middle levels of an organization to impact the decision-making process, the process is enhanced. During a VE study, the OMB task force must coordinate the interests of usually at least three parties who are frequently adversaries. These parties do not usually communicate as well as they should in the project funding and planning process. OMB; the sponsor agency who will operate the project; and the construction agency in charge of planning, design, and constructing the project all have different objectives. OMB is traditionally concerned with costs while the sponsor agency is concerned with function and the construction agency focuses primarily on producing the project.

City agency personnel from every level, the original designers of a project, the project's operating staff, OMB budget analysts, and private sector consultants would normally never confer with each other at the same time about a project. The joint input from all interested parties during the VE study results in a stronger project which is less likely to run into difficulties over its planning, design, construction, and operational life cycle.

The creative team effort makes a budget review a fruitful exercise rather than an unpleasant necessity since both the City agency and OMB benefit from the VE study. The VE study permits a budget analyst to ally with City agencies to maximize public dollars instead of having to work against the sponsor agencies' predictable opposition to cost cutting.



Future Initiatives

The VE program has expanded its staff and the number of project studied each year since the program began. The following table shows the VE unit's program growth and projections for FY88.

| <u>Year</u> | <u>Projects</u> |                  | Total Value of<br><u>Projects</u>  | No. of Professional<br><u>Staff</u> *** |
|-------------|-----------------|------------------|------------------------------------|-----------------------------------------|
|             | <u>Studied</u>  | <u>Monitored</u> | (includes previous<br>years total) |                                         |
| FY 92-FY85  | 4               | 6                | \$434.4 million                    | 2.25                                    |
| FY 86       | 10              | 29               | 864.9 million                      | 5.5                                     |
| FY 87*      | 22              | 48               | 1.5 billion                        | 6.75                                    |
| FY 88**     | 30 minimum      | 100              | 2.5 billion                        | 8                                       |

\*Includes projects to be studied

\*\*Projected Studies

\*\*\*Fractions indicate part-time staff members

During fiscal year 1987, OMB is expanding its program and developing VE units within the City's service agencies so that a much larger portion of the City's capital projects, standards, and procedures will be reviewed. These units will focus on cost avoidance and developing project improvements.

In addition to analyzing the City's four-year capital commitment plan for potential VE projects, the task force is working on other VE management initiatives to reduce costs in the capital program. This spring, the task force will conduct the first supplemental in-house VE study. In the past, OMB has utilized private consultants almost exclusively to carry out VE studies. The first in-house study is planned on a \$7 million window replacement review. More in-house studies are planned on smaller, less complex projects between \$5 to \$10 million. In-house studies will use only one or two outside consultants to supplement the present staff.

Multi-project studies are also planned for projects of a similar nature, such as schools which have identical standards and designs. Recently, a multi-design study was conducted on the proposals for a 300 cell, pre-fabricated cell addition to the Riker's Island jail. The VE team examined four proposed designs, and produced recommendations for each proposer.

A VE unit was set up in the Department of General Services last year, and a VE unit is being implemented in the Board of Education as well. By developing independent units, OMB is moving towards gradually shifting the responsibility for planned design studies to the respective City design/construction agencies. This, in turn, will permit OMB to focus its VE efforts almost exclusively on pre-design studies.

Past VE studies have focused primarily on construction; however, VE can be applied to many other City programs. The VE unit is currently planning a study to examine equipment purchases, such as fire trucks and sanitation vehicles. VE studies of the City's standard practices and policies are also planned. OMB can use its position at a policy level to recommend changes to unnecessary City procedures. In this way, a much larger universe of the City's capital program will be reviewed and improved.

## BIOGRAPHY

Mr. William C. McElligott, PE, CVS, is a Deputy Assistant Director in charge of VE at New York City's Office of Management and Budget (OMB). He holds a BA from Manhattan College and is a registered professional engineer. Mr. McElligott has worked at OMB for 22 years, and has directed the VE efforts since its inception in 1982. Prior to working for New York City government, he worked for four years in design and construction in the private sector. He is a member of the Metropolitan New York Chapter.

POLLEV

## United States Senate

COMMITTEE ON  
GOVERNMENTAL AFFAIRS  
WASHINGTON, DC 20510-6250

SAMPLE OF LETTER SENT  
TO MILITARY DEPARTMENTS

February 20, 1987

Dear :

The Subcommittee on Oversight of Government Management of the Senate Governmental Affairs Committee is obtaining information on the effectiveness of value engineering (VE) programs in the federal government. A Subcommittee hearing is anticipated in early Spring.

The purpose of the hearing is to discuss the success of the various VE efforts being made, as well as to identify any improvements that may be needed. To assist the Subcommittee in its efforts, please provide the information requested below by March 6, 1987.

- (1) Does your agency have a VE program? If so, please provide any written materials describing the program.
- (2) Please identify the amount of funds invested in VE by your agency in each fiscal year 1981 through 1986.
- (3) Has your agency established goals for any aspect of VE, such as savings, number of proposals, etc.? If so, please provide the goals for each fiscal year, 1981 through 1986, and show the actual accomplishment toward each goal. If VE goals are established below the agency-wide level, e.g., regions or field offices, please identify these goals and their respective sub-units.
- (4) What were the VE savings achieved by your agency in fiscal years 1981 through 1986? Please separate these savings by in-house savings and contractor-generated savings, if possible. If available, what was the return on investment for each of these categories?

February 20, 1987  
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(5) Please describe how VE savings are reapplied, including the extent the agency component which developed the proposal benefits from the savings.

(6) How many people are now assigned full time to VE in your agency? How many full-time equivalents?

(7) What is the highest grade or rank of any employee with full-time VE responsibilities? Please provide the name and telephone number of this employee.

(8) Please identify the number of people in your agency receiving eight hours or more of VE training in each fiscal year 1981 through 1986.

(9) Does your agency use contractors to perform VE as part of your in-house operations? If so, please describe the extent of the contractor operation.

(10) Is the use of Federal Acquisition Regulation VE clauses mandatory in any agency contracts? Please identify any other mandatory VE provisions applicable to your agency. Has your agency exempted itself or any particular activities or contract types from such clauses? If so, please identify such exemptions and provide a brief rationale for them.

(11) How many VE proposals did your agency receive in each fiscal year 1981 through 1986? Please report in-house and contractor-generated proposals separately, if possible. How many in-house and contractor-generated VE proposals were approved for the same time period?

(12) If available, what is the average time required to process contractor-generated VE change proposals? The average time to process in-house VE proposals? Please include any agency goals or standards associated with these processing times.

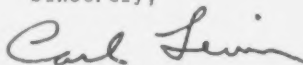
(13) To what extent do sub-contractor VE proposals contribute to VE savings in your agency?

(14) Please identify the number of approved VE proposals and associated savings for each SAR program in your Department for each fiscal year 1981 through 1986. Please report the contractor-generated and in-house proposals separately.

February 20, 1987  
Page Three

Thank you for your assistance. If you have any questions or if this letter contains requests for information that could be answered in a more cost-effective manner than as stated, please ask your staff to contact Brad Vass or Mike Cummins of the Subcommittee staff at 202-224-3682 or 202-224-6221, respectively. We would like to work with you in providing the most helpful and least time-consuming answers.

Sincerely,

A handwritten signature in cursive script that reads "Carl Levin".

Carl Levin, Chairman  
Subcommittee on Oversight  
of Government Management

CL:ljg



## United States Senate

COMMITTEE ON  
GOVERNMENTAL AFFAIRS  
WASHINGTON, DC 20510-8250

SAMPLE OF LETTER  
SENT TO CIVIL AGENCIES

February 19, 1987

Dear

The Subcommittee on Oversight of Government Management of the Senate Governmental Affairs Committee is obtaining information on the effectiveness of value engineering (VE) programs in the federal government. A Subcommittee hearing is anticipated in early Spring.

The purpose of the hearing is to discuss the success of the various VE efforts being made, as well as to identify any improvements that may be needed. To assist the Subcommittee in its efforts, please provide the information requested below by March 6, 1987.

- (1) Does your agency have a VE program? If so, please provide any written materials describing the program.
- (2) Please identify the amount of funds invested in VE by your agency in each fiscal year 1981 through 1986.
- (3) Has your agency established goals for any aspect of VE, such as savings, number of proposals, etc.? If so, please provide the goals for each fiscal year, 1981 through 1986, and show the actual accomplishment toward each goal. If VE goals are established below the agency-wide level, e.g., regions or field offices, please identify these goals and their respective sub-units.
- (4) What were the VE savings achieved by your agency in fiscal years 1981 through 1986? Please separate these savings by in-house savings and contractor-generated savings, if possible. If available, what was the return on investment for each of these categories?

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Page Two

- (5) Please describe how VE savings are reapplied, including the extent the agency component which developed the proposal benefits from the savings.
- (6) How many people are now assigned full time to VE in your agency? How many full-time equivalents?
- (7) What is the highest grade or rank of any employee with full-time VE responsibilities? Please provide the name and telephone number of this employee.
- (8) Please identify the number of people in your agency receiving eight hours or more of VE training in each fiscal year 1981 through 1986.
- (9) Does your agency use contractors to perform VE as part of your in-house operations? If so, please describe the extent of the contractor operation.
- (10) Is the use of Federal Acquisition Regulation VE clauses mandatory in any agency contracts? Please identify any other mandatory VE provisions applicable to your agency. Has your agency exempted itself or any particular activities or contract types from such clauses? If so, please identify such exemptions and provide a brief rationale for them.
- (11) How many VE proposals did your agency receive in each fiscal year 1981 through 1986? Please report in-house and contractor-generated proposals separately, if possible. How many in-house and contractor-generated VE proposals were approved for the same time period?
- (12) If available, what is the average time required to process contractor-generated VE change proposals? The average time to process in-house VE proposals? Please include any agency goals or standards associated with these processing times.
- (13) To what extent do sub-contractor VE proposals contribute to VE savings in your agency?
- (14) If your agency awards grants to states and local governments for construction projects, what was the total value of these grants for each fiscal year 1981 through 1986?

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Page Three

What percentage of the total cost for such projects was paid by the federal grant? Were any VE provisions included in such grants? If so, please describe these provisions and state what savings, if any, were realized, and how they were reapplied.

Thank you for your assistance. If you have any questions or if this letter contains requests for information that could be answered in a more cost-effective manner than as stated, please ask your staff to contact Brad Vass or Mike Cummins of the Subcommittee staff at 202-224-3632 or 202-224-6221, respectively. We would like to work with you in providing the most helpful and least time-consuming answers.

Sincerely,

*Carl Levin*

Carl Levin, Chairman  
Subcommittee on Oversight  
of Government Management

CL:ljg



## DEPARTMENT OF THE AIR FORCE

WASHINGTON, D.C. 20330

OFFICE OF THE SECRETARY

\* 1533 1537

The Honorable Carl Levin  
 Chairman, Subcommittee on Oversight  
 of Government Management  
 Committee on Governmental Affairs  
 United States Senate  
 Washington, D. C. 20510-6250

Dear Mr. Chairman:

This is in response to your letter of February 20, 1987, to the Secretary of the Air Force requesting statistical and other information on the Air Force Value Engineering (VE) Program. The following information answers your questions, using numbers corresponding to the numbers in your letter.

(1) Yes, the Air Force has an active VE program. Current written materials describing the program are Air Force Regulation 320-1 (AFR 320-1), Air Force Value Engineering Program, July 15, 1985 (Attachment 1); the new Department of Defense Directive 4245.8 (DODD 4245.8), DOD Value Engineering Program, November 19, 1986 (Attachment 2); and the Air Force FY 1987 Value Engineering Program Plan (Attachment 3). It should be noted that AFR 320-1 is in the process of being revised, and that the new DODD has been transmitted to all Air Force Major Commands (MAJCOMs) and field elements for immediate implementation.

(2) Funds specifically set aside for VE investment by the Air Force from FY 1981 through FY 1986 are arrayed on the chart at Attachment 4.

(3) Value Engineering goals are established annually in the Air Force Value Engineering Program Plan. As noted above, the FY 1987 Plan is provided at Attachment 3. The Air Force VE Program Plan for FY 1986 is at Attachment 5. Records of the VE Plans for FY 1985 and prior years have not been retained and are no longer available. Tangible accomplishments toward VE goals are recorded annually in the Air Force Statistical Report, summarized for FYs 1981 through 1986 at Attachment 4. VE goals are established below the agency-wide level by the Air Force MAJCOMs. Copies of the MAJCOM VE Program Plans for FY 1987 are at Attachment 6. We have requested the MAJCOMs to identify any additional field-level goals that have been established. These will be reported to you in a subsequent letter by March 20, 1987.

(4) VE savings achieved by the Air Force in FYs 1981 through 1986, separated by in-house savings and contractor-generated savings, along with the return on investment for each category for each year are arrayed on the chart provided at Attachment 4.

(5) A survey is being made of our MAJCOMs on this question. We will provide a comprehensive answer to you by March 20, 1987.

(6) To our knowledge, there are now two people assigned full-time to VE in the Air Force, and a total of 10.3 full-time equivalents assigned to VE throughout the Air Force. We have asked our MAJCOMs to confirm this. Should there be any change, we will so advise you in our next letter.

(7) The highest grade or rank of any employee with full-time VE responsibilities in the Air Force is Grade 13, of which there are two. One is with Air Force Systems Command: Mr. Grover Cleveland (GS-13), telephone (513) 255-3460; the other is with Air Force Logistics Command: Mr. Marshall Whitaker (GS-13), telephone (513) 257-5571.

(8) Statistics on the number of people trained each year from FYs 1981 through 1986 are shown, as collected, on the chart at Attachment 4.

(9) A survey is being made of our MAJCOMs on this question. We will provide a comprehensive answer to you by March 20, 1987.

(10) Air Force contracts include language and specific VE clauses as required by the Federal Acquisition Regulation (FAR) (Attachment 7) and the DOD FAR Supplement (Attachment 8). There is no Air Force FAR Supplement pertaining to VE, nor are there any MAJCOM FAR Supplements pertaining to VE. The Air Force has not exempted itself or any particular activities or contract types from the existing clauses.

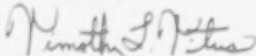
(11) The number of VE proposals received by the Air Force in each FY 1981 through 1986, separated by in-house and contractor-generated proposals, along with the number approved in each category, is arrayed on the chart at Attachment 4.

(12) and (13) These questions are included in the survey being made of our MAJCOMs. Comprehensive answers will be included in our next letter.

(14) The number of approved contractor-generated VE proposals and associated savings for each Selected Acquisition Report (SAR) program in the Air Force for each FY 1981 through 1986 is arrayed on the chart at Attachment 4. The programs identified on the chart in each year are the only major programs (with estimated total Research, Development, Test and Evaluation (RDT&E) costs greater than \$200 million or with total procurement (production) costs greater than \$1 billion) for which contractor-generated VE savings were reported. No other SAR programs had approved VE proposals or savings. In-house VE statistics are not collected for SAR programs.

We hope this information will be helpful to you. We look forward to participating in the upcoming hearings on Value Engineering.

Sincerely,



TIMOTHY L. TITUS  
Colonel, USAF  
Chief, Program Liaison Division  
Office of Legislative Liaison

Attachments

## AIR FORCE

## (2) AMOUNT OF FUNDS SPECIFICALLY SET ASIDE FOR VE INVESTMENT:

|             | FY 81    | FY 82    | FY 83   | FY 84    | FY 85     | FY 86     |
|-------------|----------|----------|---------|----------|-----------|-----------|
| RD&E        | \$0.305M | \$1.183M | \$ 0.6M | \$0.040M | \$21.100M | \$39.179M |
| Procurement | 5.917M   | 0.441M   | 12.5M   | .00      | 10.500M   | .00       |
| GM          | 0.096M   | 0.300M   | 0.4M    | 0.528M   | 0.030M    | 0.166M    |
| Total       | \$6.398M | \$1.924M | \$13.5M | \$0.568M | \$31.700M | \$39.345M |

## (4) VE SAVINGS:

|                              |          |          |          |          |          |          |
|------------------------------|----------|----------|----------|----------|----------|----------|
| In-House Savings             | \$375.3M | \$689.1M | \$719.2M | \$138.4M | \$603.0M | \$550.1M |
| ROI                          | 37.1:1   | 62.6:1   | 16.4:1   | 105.8:1  | 18:1     | 83.4:1   |
| Contractor-Generated Savings | \$14.9M  | \$50.0M  | \$40.7M  | \$164.7M | \$77.9M  | \$57.9M  |
| ROI                          | 2.1:1    | 6.4:1    | 7.5:1    | 63.3:1   | 11:1     | 23.5:1   |

## (8) NUMBER OF PEOPLE RECEIVING 8 HOURS OR MORE OF VE TRAINING:

|                                |       |     |     |     |     |       |
|--------------------------------|-------|-----|-----|-----|-----|-------|
| Methods/P&VE (40 or more hrs.) | 213   | 249 | 347 | 228 | 111 | 133   |
| Clauses/CAVE (40 or more hrs.) | 19    | 51  | 93  | 11  | 30  | 93    |
| Indoctrination (4 or 8 hrs.)   | 1,258 | 781 | 598 | 562 | n/a | n/a   |
| Orientations (4 to 40 hrs.)    | n/a   | n/a | n/a | n/a | 31  | 608   |
| Seminars (2 to 4 hrs.)         | n/a   | n/a | n/a | n/a | 127 | 1,050 |



## AIR FORCE

FY 81

FY 82

FY 83

FY 84

FY 85

FY 86

## (11) VE PROPOSALS RECEIVED AND APPROVED:

|                     |     |     |     |     |     |     |
|---------------------|-----|-----|-----|-----|-----|-----|
| In-House Developed  | 348 | 412 | 362 | 318 | 304 | 399 |
| In-House Approved   | 291 | 348 | 318 | 282 | 220 | 311 |
| Contractor Received | 132 | 169 | 109 | 181 | 203 | 192 |
| Contractor Approved | 60  | 65  | 89  | 81  | 103 | 91  |

## (14) SAR PROGRAMS -- (a) PROGRAM; (b) # OF VECPS APPROVED; (c) DOD SAVINGS:

|                    |             |           |            |                  |                |
|--------------------|-------------|-----------|------------|------------------|----------------|
| (a) E-3A           | F-15        | F-15      | B1-B       | F-16 (Simulator) | WIS            |
| (b) 4              | 2           | 1         | 3          | 3                | 1              |
| (c) \$1.620M       | \$0.334M    | \$0.227M  | \$1.896M   | \$3.480M         | \$3.939M       |
| (a) Minuteman      | F-16        | F-16      | C-50       | B-52 OAS         | OTH-B          |
| (b) 3              | 5           | 7         | 2          | 1                | 1              |
| (c) \$0.035M       | \$2.889M    | \$6.423M  | \$20.456M  | \$12.090M        | \$0.063M       |
| (a) ASMS           | EF-111A     | E-3A      | E-3A       | Maverick         | TRI-TAC        |
| (b) 2              | 1           | 3         | 2          | 3                | 1              |
| (c) \$0.158M       | \$0.582M    | \$18.822M | \$0.605M   | \$32.510M        | \$0.271M       |
| (a) F-15 Simulator | CM1/OAS     | Minuteman | T-46A      | DSCS 111         | B1-B           |
| (b) 2              | 2           | 1         | 1          | 5                | 3              |
| (c) \$0.168M       | \$13.074M   | \$0.043M  | \$0.441M   | \$0.042M         | \$8.435M       |
| (a) AGH 65         | ALCM        | Maverick  | Maverick   | OTH-B            | F-16           |
| (b) 1              | 4           | 12        | 2          | 10               | 1              |
| (c) \$0.070M       | \$2.751M    | \$7.832M  | \$128.92M  | \$1.952M         | \$12.231M      |
| (a) EF-111         | NAVSTAR GPS | PAVETACK  | Simulators |                  | Upperstage Pgm |
| (b) 1              | 2           | 3         | 1          |                  | 1              |
| (c) \$0.218M       | \$2.555M    | \$0.131M  | \$0.199M   |                  | \$0.368M       |





DEPARTMENT OF THE AIR FORCE  
WASHINGTON, D.C. 20330-1000

OFFICE OF THE SECRETARY

3 APR 1987

The Honorable Carl Levin  
Chairman, Subcommittee on Oversight  
of Government Management  
Committee on Governmental Affairs  
United States Senate  
Washington, D. C. 20510-0001

Dear Mr. Chairman:

This is in further response to your letter of February 20, 1987, requesting information on the Air Force Value Engineering (VE) Program. A survey has been made of the Air Force's major commands (MAJCOMs) to acquire the more detailed information requested. The following additional information completes our response.

Question (3): Has your agency established goals for any aspect of VE, such as savings, number of proposals, etc.? If so, please provide the goals for each fiscal year, 1981 through 1986, and show the actual accomplishment toward each goal. If VE goals are established below the agency-wide level, e.g., regions or field offices, please identify these goals and their respective sub-units.

Since FY 1985, the Air Force has required Air Force Systems Command (AFSC) and Air Force Logistics Command (AFLC) to work toward a goal of one percent of procurement total obligation authority (TOA) in savings from in-house VE proposals and 0.7 percent of procurement TOA in savings from contractor-generated VE change proposals (VECPs). For many years prior to 1985, AFLC had independently established goals. The following chart depicts the VE goals and accomplishments for AFSC and AFLC:

|                                          | 1986     |          | 1985     |          |
|------------------------------------------|----------|----------|----------|----------|
|                                          | AFSC     | AFLC     | AFSC     | AFLC     |
| In-House Goal<br>(1% of TOA):            | \$192.7M | \$162.5M | \$197.9M | \$124.1M |
| In-House Savings:                        | \$110.5M | \$439.7M | \$214.2M | \$393.0M |
| Contractor Savings<br>Goal (.7% of TOA): | \$134.9M | \$113.7M | \$138.5M | \$ 86.8M |
| Contractor-<br>Generated Savings:        | \$ 31.7M | \$ 24.8M | \$ 50.9M | \$ 24.8M |

It should be noted that the Air Force is currently evaluating the present VE goal structure with an eye toward providing more appropriate and more individualized goals. Results will be reflected in the upcoming revision to Air Force Regulation (AFR) 320-1.

For prior years, AFLC had the following overall goals and accomplishments:

|      | <u>Overall VE Goal</u> | <u>Total VE Savings</u> |
|------|------------------------|-------------------------|
| 1984 | \$192,000,000          | \$326,500,000           |
| 1983 | \$182,100,000          | \$600,830,000           |
| 1982 | \$167,000,000          | \$611,630,000           |
| 1981 | \$145,000,000          | \$319,620,000           |

For the years 1981 through 1984, there is no goal data for AFSC.

Tactical Air Command (HQ TAC) has established goals as part of its FY 1987 VE Program Plan, a copy of which was provided with our prior letter. Progress on these goals will be reported at the end of FY 1987.

Pacific Air Forces Command (HQ PACAF) initiated a goal of 0.7 percent of the procurement TOA for contractor-generated VE cost avoidance for FY 1986. PACAF found this goal to be unrealistic inasmuch as no VECs were approved.

Alaskan Air Command (HQ AAC) began establishing goals in 1985 in terms of number of VE proposals submitted. Their accomplishments are as shown below:

| <u>FY</u> | <u>Goal Established</u> | <u>Submittal of<br/>VE Proposals</u> |
|-----------|-------------------------|--------------------------------------|
| 1986      | 3                       | 3                                    |
| 1985      | 3                       | 4                                    |
| 1984      | 0                       | 1                                    |
| 1983      | 0                       | 4                                    |
| 1982      | 0                       | 5                                    |
| 1981      | 0                       | 1                                    |

Strategic Air Command (HQ SAC) customarily destroys VE files every two years so data is only available for FYs 1985 and 1986. The goal is to receive at least five contractor-generated VECs each year. For FY 1985, SAC received 11 VECs and approved six. For FY 1986, SAC received seven VECs and approved six.

Question (5): Please describe how VE savings are reapplied, including the extent the agency component which developed the proposal benefits from the savings.

Generally, savings are reapplied to valid, unfunded needs of the highest priority within the same program office, at the same Air Force base, or within the same MAJCOM. Projected outyear savings are reflected in reduced budget requests.

Question (6): How many people are now assigned full time to VE in your agency? How many full time equivalents?

Our MAJCOM survey indicates that there are a total of seven, not two, people assigned full time to VE in the Air Force. As previously stated, there are 10.3 full time equivalents assigned to VE throughout the Air Force.

Question (9): Does your agency use contractors to perform VE as part of your in-house operations? If so, please describe the extent of the contractor operation.

The Air Force does not use contractors to originate in-house VE proposals. However, two Air Force MAJCOMs occasionally use contractors to provide technical assistance and engineering support that is not available in-house when they are evaluating either a VEC or VEP. Such contractor support would be in the nature of performing feasibility studies, or providing special knowledge or capability not otherwise available.

Question (12): If available, what is the average time required to process contractor-generated VE change proposals? The average time to process in-house VE proposals? Please include any agency goals or standards associated with these processing times.

We define the term "time to process" as the time span from receipt of a VE proposal to its ultimate approval or disapproval. The Air Force does not keep statistics on such processing times, and there are no specific Air Force-wide goals or standards associated with processing times. Air Force guidance on processing times is contained in AFR 320-1, paragraph 4f. AFR 320-1 was provided to you with our prior letter.

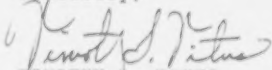
It should be noted that many variables affect the processing time for a given proposal, such as complexity of the proposal or equipment it concerns, test time, completeness of engineering and economic data presented, resources availability, and agency/interpersonal communications involved.

Question (13): To what extent do sub-contractor VE proposals contribute to VE savings in your agency?

Our MAJCOM survey indicates that sub-contractor VE proposals contribute practically no VE savings in the Air Force.

We hope this information is useful. Please let us know if we may be of any further assistance.

Sincerely,



TIMOTHY L. TITUS  
Colonel, USAF  
Chief, Program Liaison Division  
Office of Legislative Liaison



OFFICE, CHIEF OF  
LEGISLATIVE LIAISON

DEPARTMENT OF THE ARMY  
OFFICE OF THE SECRETARY OF THE ARMY  
WASHINGTON, DC 20310

10 MAR 1987

Honorable Carl Levin  
Chairman  
Subcommittee on Oversight  
of Government Management  
Committee on Governmental Affairs  
United States Senate  
Washington, D. C. 20510

Dear Mr. Chairman:

Thank you for your interest in the Army's Value Engineering Program. The VE program enhances productivity by eliminating unnecessary functions and by taking advantage of the state-of-the-art technology to reduce both in-house and contract costs.

The information requested in your 20 February letter is contained at enclosure 1 with an annex provided for each of the individual fiscal years, 1981 through 1986. Where actual accomplished dollar savings are stated, these are net dollar savings. Direct costs for developing, testing, or prototyping the proposals were subtracted to arrive at the net figure. Because it has not been economically feasible to isolate and charge indirect costs associated with government processing, evaluation, and acceptance/rejection of individual VECs/VEPs, the calculated Return-on-Investment (ROI) tends to be higher than it otherwise might be.

In reviewing the individual fiscal years, you will find that prior to fiscal 85 only the first year of dollar savings resulting from approved in-house VEPs was reportable. Beginning with fiscal 85, three year dollar savings are reported for approved VEPs, similar to the three year dollar savings that have always been reported for approved contractor VECs. Also, prior to fiscal 85, VEC savings estimates were reported at time of VEC technical approval by the government. Beginning with fiscal 85 VEC savings are reported after contract modification and financial settlement with the contractor.

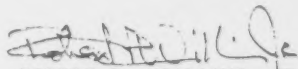


During a 19 February 1987 visit with Mr. Brad Vass, of your office, he was handed a value engineered item, a part of the M483A1 projectile, in its "before" and "after" configuration. Per his request, additional information on this VECP is provided at Annex I.

I hope you will find the enclosed information helpful. Further questions may be directed to Mr. Henry Mladozeniec at 695-1768.

Enclosure

Sincerely,

  
ROBERT P. WILLIAMS, JR.  
Lieutenant Colonel, JA  
Legislative Counsel

## DEPARTMENT OF THE ARMY VALUE ENGINEERING (VE) PROGRAM

Each of the below numbered paragraphs of Senator Levin's 20 February letter to the Secretary of the Army are followed by a reply to the question(s) posed.

(1) Does your agency have a VE program? If so, please provide any written materials describing the program.

Yes, Army Regulation 5-4, Chapter 4 is contained at TAB J. Army Regulation 5-4 is currently in revision and Chapter 4, Value Engineering Program, is being updated to reflect the reissued DoDD 4245.8, 19 November 1986.

(2) Please identify the amount of funds invested in VE by your agency in each fiscal year 1981 through 1986.

See TAB A Thru F for respective fiscal years.

(3) Has your agency established goals for any aspect of VE, such as savings, number of proposals, etc.? If so, please provide the goals for each fiscal year, 1981 through 1986, and show the actual accomplishment toward each goal. If VE goals are established below the agency-wide level, e.g., regions or field offices, please identify these goals and their respective sub-units.

Yes, see TAB A thru F for respective fiscal years.

(4) What were the VE savings achieved by your agency in fiscal years 1981 through 1986? Please separate these savings by in-house savings and contractor-generated savings, if possible. If available, what was the return on investment for each of these categories?

See TAB A thru F for respective fiscal years,

(5) Please describe how VE savings are reapplied, including the extent the agency component which developed the proposal benefits from the savings.

VE dollar savings are retained at point of origin, that is at the depot, arsenal, project manager's office, or MACOM for reapplication to priority approved but unfinanced requirements where practicable. A documented reprogramming statement must show the amount of the VE dollar savings and where it was reprogrammed to. Reuse of savings in this manner creates an incentive for participation in the VE program.

(6) How many people are now assigned full time to VE in your agency: How many full-time equivalents?

The Army has approximately 100 full time VE personnel. This excludes clerical and secretarial support. See TAB A thru F for specific numbers of VE personnel during each fiscal year 81-86.

(7) What is the highest grade or rank of any employee with full-time VE responsibilities? Please provide the name and telephone number of this employee.

GM-15, Army VE Program Manager, Mr. Henry S. Mlodozeniec, (202) 695-1768.

(8) Please identify the number of people in your agency receiving eight hours or more of VE training in each fiscal year 1981 through 1986.

See TAB A thru F for respective fiscal years.

(9) Does your agency use contractors to perform VE as part of your in-house operations? If so, please describe the extent of the contractor operation.

Yes. In addition to value engineering work done by Government personnel, the Army utilizes the services of VE consultants, Engineering Services contractors and production contractors in the performance of its in-house program, this is especially true at the Army Materiel Command (AMC).

Contractors are utilized to supplement the limited dedicated VE resources available within AMC. In this capacity as they perform to their contract requirements, they are paid for their efforts and receive no sharing in the resultant savings. The "extent of contractor operation", as far as dollar value or percent of contribution, is not documented in a special category of in-house VE effort. Typical activities undertaken by contractors are:

(a) Conduct of VE training and workshops for both Government and production contractor personnel.

(b) Identification of cost-driver areas having a high potential for possible VE savings.

(c) Performance of complete VE studies as directed by their contract through the Procurement Contracting Officer (PCO) without the assistance of Government personnel.

(d) Complete VE studies on items/functions identified by Government personnel.

(10) Is the use of Federal Acquisition Regulation (FAR) VE clauses mandatory in any agency contracts? Please identify any other mandatory VE provisions applicable to your agency. Has your agency exempted itself or any particular activities or contract types from such clauses? If so, please identify such exemptions and provide a brief rationale for them.

Yes, the use of Federal Acquisition Regulation VE Incentive clauses is mandatory. By way of clarification, a VE Incentive Clause is required (a) if the contract amount is expected to exceed \$100,000 (FAR part 48.201) and (b) in all contracts for spare parts and repair kits of \$25,000 or more, for other than standard commercial parts (DOD FAR Supplement 48.201).

A VE Program Requirements Clause (VEPRC) is now required in all initial production contracts (first and second production buys) for major systems (DEPSECDEF Memorandum, 26 March 1986). Within AMC, a VEPRC is required in major systems production contracts as above and all other production contracts over \$10 million. The Army VE Program has not sought any exemptions.

(11) How many VE proposals did your agency receive in each fiscal year 1981 through 1986? Please report in-house and contractor-generated proposals separately, if possible. How many in-house and contractor-generated VE proposals were approved for the same time period?

See TAB A thru F for respective fiscal years.

(12) If available, what is the average time required to process contractor-generated VE change proposals? The average time to process in-house VE proposals? Please include any agency goals or standards associated with these processing times.

Prior to publication of DoD Directive 4245.8, November 19, 1986, DoD Value Engineering Program, there was no requirement from DoD to track processing time. Prior to FY 85, the VE program did not accurately track this data, either. What is available has been requested and will be provided under separate cover within 30 days. Although the goals for processing, stated below, have not yet been achieved at AMC, progress is being made toward these goals.

PROCESSING GOALS: In a Commander's Guidance Statement (CGS) No. 46, dated 29 August 1985, the AMC Commanding General issued the following guidance:

(a) Acknowledgement of receipt of VECF is provided to the contractor within 45 days.

(b) Approval or disapproval (technical) is provided within 60 days to the contractor.

(c) Financial Settlement of VECFs is accomplished within 90 days of technical approval.

(13) To what extent do sub-contractor VE proposals contribute to VE savings in your agency?

Because of the regulatory procurement practices and the FAR requirements for VECFs, this data is not available and can not be made available. The Government only recognizes the prime contractor in its contractual dealings. For a VECF to be submitted, the contractor must have a contract with the Government. Only prime contractors have this relationship. Any VECF submitted to the Government, regardless of where the action actually originated, appears to have originated with the prime contractor. This is not to say that sub-contractor participation in prime contractor VE programs is not encouraged. With the amount of dollars which are spent with sub-contractors, any successful VE program must have sub-contractor involvement and participation in the VECF process.

(14) Please identify the number of approved VE proposals and associated savings for each SAR program in your Department for each fiscal year 1981 through 1986. Please report the contractor-generated and in-house proposals separately.

See TAB G for approved Army major system contractor VECFs.

See TAB H for approved Army major system in-house VEPs.

## DEPARTMENT OF THE ARMY VALUE ENGINEERING PROGRAM - FY 81

- 0 Army Funds Invested in Value Engineering (VE) Program \$18.0 million against an investment goal of \$19.1 million
- 0 FY 81 VE Program Goals and Objectives. The following Army VE goals and objectives are established:

a. Each command will establish and maintain an annual VE Program Master Plan converting expected activity in training, manpower, funding, and in-house and contractual VE projects.

b. Obtain an annual savings from Value Engineering Change Proposals to achieve the Department of Defense goal of seven-tenths of one percent of the procurement total obligation authority.

c. Invest \$19.1 million in FY 81 in VE projects with an overall potential return on investment of 8 to 1.

| <u>MACOM</u>          | <u>Investment (\$ Millions)</u> |
|-----------------------|---------------------------------|
|                       | <u>FY 81</u>                    |
| DARCOM                | 14.0                            |
| ACC                   | 3.0                             |
| COE                   | 1.6                             |
| USAREUR               | .5                              |
|                       | <u>\$19.1M</u>                  |
| TOTAL GOAL            |                                 |
| ACTUAL ACCOMPLISHMENT | \$18.0M                         |

d. DARCOM to invest an average of \$.5 million dollars in VE projects on each major program in production to offset production cost growth.

e. Promote the increased use of Value Engineering on Army contracts and receive Value Engineering Change Proposals (VECPs) in FY 81 as follows:

| <u>MACOM</u>          | <u>Number of VECPs</u> |
|-----------------------|------------------------|
|                       | <u>FY 81</u>           |
| DARCOM                | 600                    |
| ACC                   | 40                     |
| COE                   | 200                    |
| USAREUR               | 25                     |
|                       | <u>865</u>             |
| TOTAL GOAL            |                        |
| ACTUAL ACCOMPLISHMENT | 816                    |

f. Originate in-house Value Engineering Proposals (VEPs) to improve Efficiency, Economy, and Management Improvements in hardware, software, support activities, services, processes and procedures as follows:

| <u>MACOM</u>          | <u>Number of In-House VEPs</u> |
|-----------------------|--------------------------------|
|                       | <u>FY 81</u>                   |
| DARCOM                | 1275                           |
| ACC                   | 76                             |
| COE                   | 140                            |
| USAREUR               | 25                             |
|                       | <u>1516</u>                    |
| TOTAL GOAL            |                                |
| ACTUAL ACCOMPLISHMENT | 1738                           |

0 In-House VEP Savings (first year savings)

\$336.1 Million  
21:1 ROI

0 Contractor VECF Savings (3 year savings)

\$55.3 Million  
27.5:1 ROI

0 Number of Full-Time VE Personnel (no clerical or secretarial) on board end of FY 81: 66

0 Training: Number of personnel trained during FY 81

a. 40-hour (or more) Principles & Applications of Value Engineering Course: 462

b. 40-hour Contractual Aspects of Value Engineering 14

c. VE Indoctrination (4 hours): 1,222

0 In-House VEPs Received 1,738

In-House VEPs Approved 1,229

0 Contractor VECFs Received 816

Contractor VECFs Approved 415



## DEPARTMENT OF THE ARMY VALUE ENGINEERING PROGRAM - FY 85

- O Army Funds Invested in Value Engineering (VE) Program \$13.3 million against an investment goal of \$28.3 million.
- O FY 85 Program Goals and Objectives: The following Army VE goals and objectives are established:

a. Each command will prepare and maintain an annual VE Program Master Plan covering expected activity in VE training, manpower, funding, and in-house and contractual VE projects.

b. Invest \$28.3 million in FY 85 in VE projects with an overall potential return on investment of 10 to 1. Value Engineering investment is needed to augment VE training, in-house VE projects, development and testing of internal or contractor submitted VE proposals.

| <u>MACOM</u>          | <u>Investment (\$ Millions)</u> |
|-----------------------|---------------------------------|
|                       | <u>FY 85</u>                    |
| DARCOM                | 19.0                            |
| ACC                   | 1.5                             |
| COE                   | 5.0                             |
| USAREUR               | 0.8                             |
| FORSCOM               | 1.0                             |
| TRADOC                | 1.0                             |
| TOTAL GOAL            | 28.3M                           |
| ACTUAL ACCOMPLISHMENT | 13.3M                           |

d. DARCOM to invest an average of \$0.5 million dollars in VE projects on each major program in production to offset production cost growth.

e. Promote the increased use of Value Engineering on Army contracts and receive Contractor Value Engineering Change Proposals (VECPs) as follows:

| <u>MACOM</u>          | <u>Number of VECPs</u> |
|-----------------------|------------------------|
|                       | <u>FY 85</u>           |
| DARCOM                | 750                    |
| ACC                   | 25                     |
| COE                   | 250                    |
| USAREUR               | 20                     |
| FORSCOM               | 10                     |
| TRADOC                | 10                     |
| TOTAL GOAL            | 1065                   |
| ACTUAL ACCOMPLISHMENT | 980                    |

f. Originate in-house Value Engineering Proposals (VEPs) to improve Efficiency, Economy, and Management Improvements in hardware, software, operation, maintenance support activities, services, processes and procedures, as follows:

| MACOM   | Number of In-house VEPs      |
|---------|------------------------------|
|         | <u>FY 83</u>                 |
| DARCOM  | 1600                         |
| ACC     | 100                          |
| COE     | 300                          |
| USAREUR | 50                           |
| FORSCOM | 15                           |
| TRADOC  | 15                           |
|         | <u>TOTAL GOAL</u>            |
|         | 2080                         |
|         | <u>ACTUAL ACCOMPLISHMENT</u> |
|         | 1305                         |

0 In-House VEP Savings (3 year savings)

\$598.7 Million  
55:1 ROI

0 Contractor VECF Savings (3 year savings)

\$174.2 Million  
71.4:1 ROI

0 Number of Actual Full-Time VE Personnel (excluding clerical and secretarial) at the end of FY 83 100

0 Training: Number of personnel trained during FY 83 in VE

a. Principles and Applications of Value Engineering (40 hours or more) 1041

b. Contractual Aspects of Value Engineering (40 hours or more) 61

c. VE Orientation (4 hours) 1308

0 In-House VEPs Received 1305

In-House VEPs Approved 928

0 Contractor VECFs Received 980

Contractor VECFs Approved 486

## DEPARTMENT OF THE ARMY VALUE ENGINEERING PROGRAM - FY 86

- O Army Funds Invested in Value Engineering (VE) Program  
\$25.9 million against an investment goal of \$27.8 million
- O FY 86 Program Goals and Objectives: The following Army VE goals and objectives are established:
- Each MACOM will prepare and maintain an annual VE Program Master Plan covering expected activity in VE training, manpower, funding, and in-house and contractual VE projects.
  - Obtain an annual savings from contractor Value Engineering Change Proposals (VECPs) to achieve the Department of Army goal of one percent of the procurement total obligation authority.
  - Invest during FY 86 in VE projects with an overall potential return on investment of 10 to 1. Value Engineering investment is needed to augment VE training, in-house VE projects, development and testing of internal or contractor submitted VE proposals.

| <u>MACOM</u>          | <u>Investment (\$ Million)</u> |
|-----------------------|--------------------------------|
|                       | <u>FY 86</u>                   |
| USAMC                 | 19.0                           |
| USAISC                | 1.0                            |
| USACE                 | 5.0                            |
| USAREUR               | 0.8                            |
| USAFORSCOM            | 1.0                            |
| USATRADO              | 1.0                            |
| TOTAL GOAL            | 27.8M                          |
| ACTUAL ACCOMPLISHMENT | 25.9M                          |

- USAMC to invest an average of \$0.5 million dollars in VE projects on each major program in production, to offset production cost growth.
- Promote the increased use of Value Engineering Incentive and Program Requirement Clauses in Army contracts and receive Contractor Value Engineering Change Proposals (VECPs) as follows:

| <u>MACOM</u>          | <u>Number of VECPs</u> |
|-----------------------|------------------------|
|                       | <u>FY 86</u>           |
| USAMC                 | 800                    |
| USAISC                | 33                     |
| USACE                 | 400                    |
| USAREUR               | 20                     |
| USAFORSCOM            | 15                     |
| USATRADO              | 15                     |
| TOTAL GOAL            | 1283                   |
| ACTUAL ACCOMPLISHMENT | 974                    |

f. Originate in-house Value Engineering Proposals (VEPs) to reduce cost and increase productivity in hardware, software, operations, maintenance support activities, services, processes and procedures as follows:

| <u>MACOM</u>          | <u>Number of In-house VEPs</u> |
|-----------------------|--------------------------------|
|                       | <u>FY 86</u>                   |
| USAMC                 | 1600                           |
| USAISC                | 120                            |
| USACE                 | 400                            |
| USAREUR               | 50                             |
| USAFORSCOM            | 30                             |
| USATRADO              | 20                             |
| TOTAL GOAL            | 2220                           |
| ACTUAL ACCOMPLISHMENT | 2013                           |

O In-House VEP Savings (3 year savings)

Not available, final validation and tally in process.  
In-house savings are expected to substantially exceed previous FY.

O Contractor VECF Saving (3 year savings)

\$295.3 Million  
74.1 ROI

O Number of Actual Full-Time VE Personnel (excluding clerical and secretarial) at the end of FY 86 103

O Training: Number of personnel trained during FY 86 in VE

a. Principles and Applications of Value Engineering (40 hours or more) 1153

b. Contractual Aspects of Value Engineering (40 hours or more) 288

c. VE Orientations (4 hours) 2064

O In-House VEPs Received 2013

In-House VEPs Approved 1316

O Contractor VECFs Received 974

Contractor VECFs Approved 618



DEPARTMENT OF THE NAVY  
OFFICE OF THE SECRETARY  
WASHINGTON, D.C. 20350-1000

19 March 1987

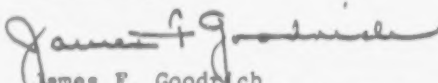
The Honorable Carl Levin  
Chairman, Subcommittee on Oversight  
of Government Management  
Committee on Governmental Affairs  
United States Senate  
Washington, D.C. 20510-6250

Dear Mr. Chairman:

In response to your recent letter, the attached information contains answers to the questions from your Subcommittee regarding the Department of the Navy's Value Engineering Program.

I am convinced that the Department of the Navy is a leader in this important effort, and the full benefits of the Value Engineering Program are yet to be realized.

Sincerely,

  
James F. Goodrich  
Acting Secretary of the Navy

Attachment

## DEPARTMENT OF THE NAVY VALUE ENGINEERING (VE) PROGRAM

Answers to questions asked by the Subcommittee on Oversight of Government Management of the Senate Governmental Affairs Committee.

1. Question: Does your agency have a VE program? If so, please provide any written materials describing the program.

Answer: Yes. The Department of the Navy is actively engaged in a strong and dedicated VE program. This program, which encompasses all Navy and Marine Corps activities, is implemented and enforced by SECNAVINST 4858.2E (TAB A).

2. Question: Please identify the amount of funds invested in VE by your agency in each fiscal year 1981 through 1986.

Answer: The funds invested in VE by FY-81 through FY-86 are shown below:

| <u>Fiscal Year</u> | <u>\$ Amount of Investment</u><br>(millions) |
|--------------------|----------------------------------------------|
| 1981               | \$ 7.7                                       |
| 1982               | 9.0                                          |
| 1983               | 8.8                                          |
| 1984               | 13.3                                         |
| 1985               | 35.1                                         |
| 1986               | 54.2                                         |

3. Question: Has your agency established goals for any aspect of VE, such as savings, number of proposals, etc.? If so, please provide the goals for each fiscal year, 1981 through 1986, and show the actual accomplishment toward each goal. If VE goals are established below the agency-wide level, e.g., regions or field offices, please identify these goals and their respective sub-units.

Answer: The Department of the Navy issued VE program plans to effectively and fully implement VE within all Navy and Marine Corps activities. Program plans for FY-83 through FY-87 are provided by TAB 3. The program plans for FY-85, FY-86 and FY-87 established both savings and training goals as shown.

4. Question: What were the VE savings achieved by your agency in fiscal years 1981 through 1986? Please separate these savings by in-house savings and contractor-generated savings, if possible. If available, what was the return on investment for each of these categories?

Answer: The VE savings for FY-81 through FY-86 and the return on investment are shown in TAB C.

5. Question: Please describe how VE savings are reapplied, including the extent the agency component which developed the proposal benefits from the savings.

Answer: It is the policy of the Department of the Navy that VE savings remain within the department for reinvestment and for help in stretching the acquisition resources. This policy was emphasized by Mr. Everett Pyatt, the Assistant Secretary of the Navy for Shipbuilding and Logistics, in his memorandum of 7 January 1985, TAB D.

6. Question: How many people are now assigned full time to VE in your agency? How many full-time equivalents?

Answer: As of 1 January 1987 there were 22 actual full-time professional and knowledgeable personnel working on VE programs. Clerical and secretarial functions are not included.

7. Question: What is the highest grade or rank of any employee with full-time VE responsibilities? Please provide the name and telephone number of this employee.

Answer: Mr. John B. Todaro, GM-15, in the Office of the Assistant Secretary of the Navy for Shipbuilding and Logistics, is the Value Engineering Principal. His telephone number is 692-0815.

8. Question: Please identify the number of people in your agency receiving eight hours or more of VE training in each fiscal year 1981 through 1986.

Answer: The Department of the Navy realizes that formal VE training is essential for the conduct of an effective VE program. Formal training programs, orientation classes, seminars and workshops are being given to both Navy and contractor personnel. VE training statistics for each FY-81 through FY-86 are shown below:

| <u>Fiscal Year</u> | <u>Number of Personnel that<br/>Received VE Training</u> |
|--------------------|----------------------------------------------------------|
| 1981               | 62                                                       |
| 1982               | 54                                                       |
| 1983               | 79                                                       |
| 1984               | 555                                                      |
| 1985               | 1,457                                                    |
| 1986               | 2,735                                                    |



9. Question: Does your agency use contractors to perform VE as part of your in-house operations? If so, please describe the extent of the contractor operation.

Answer: Contractors are not generally used to perform in-house operations. The Department of the Navy considers VE to be an effective and viable management tool and encourages the full support and attention of top level management.

10. Question: Is the use of Federal Acquisition Regulation VE clauses mandatory in any agency contracts? Please identify any other mandatory VE provisions applicable to your agency. Has your agency exempted itself or any particular activities or contract types from such clauses? If so, please identify such exemptions and provide a brief rationale for them.

Answer: Yes. The use of Federal Acquisition Regulation VE clauses is mandatory in Navy contracts. The Navy Specification Control Advocate General's (SPECAG) office reviews all Navy Acquisition Plans for content relating to acquisition streamlining, value engineering, standardization and parts control. Mr. John B. Tocharo is an assistant on the staff of the SPECAG. Exemptions are not normally requested and are not granted.

11. Question: How many VE proposals did your agency receive in each fiscal year 1981 through 1986? Please report in-house and contractor-generated proposals separately, if possible. How many in-house and contractor-generated VE proposals were approved for the same time period?

Answer: The number of approved VE proposals and number of approved VE change proposals for FY-81 through FY-86 are shown in TAB C.

12. Question: If available, what is the average time required to process contractor-generated VE change proposals? The average time to process in-house VE proposals? Please include any agency goals or standards associated with these processing times.

Answer: This information is not readily available. The Navy goal for processing as established by SECNAVINST 4359.2E is 45 days.

13. Question: To what extent do sub-contractor VE proposals contribute to VE savings in your agency?

Answer: In general, the prime contractors submit most of the VECPS. The Department of the Navy, however, encourages the prime contractor to solicit sub-contractor support to the maximum extent practical.

14. Question: Please identify the number of approved VE proposals and associated savings for each SAR program in your department for each fiscal year 1981 through 1986. Please report the contractor-generated and in-house proposals separately.

Answer: TAB E reflects Navy VE cost savings from FY-81 through FY-86 for the SAR programs. VE data on SAR programs was not maintained as a separate category until FY-83.

VALUE ENGINEERING (VE) STATISTICS  
FY-81 THROUGH FY-86

| <u>FISCAL<br/>YEAR</u> | <u>VEP<br/>SAVINGS<br/>(million)</u> | <u>VECP<br/>SAVINGS<br/>(million)</u> | <u>TOTAL<br/>SAVINGS<br/>(million)</u> | <u>NO. OF<br/>APPROVED<br/>VEPs</u> | <u>NO. OF<br/>APPROVED<br/>VECPs</u> | <u>RETURN<br/>ON<br/>INVESTMENT</u> |
|------------------------|--------------------------------------|---------------------------------------|----------------------------------------|-------------------------------------|--------------------------------------|-------------------------------------|
| 1981                   | 73                                   | 24                                    | 97                                     | 695                                 | 109                                  | 13 to 1                             |
| 1982                   | 77                                   | 32                                    | 109                                    | 268                                 | 179                                  | 12 to 1                             |
| 1983                   | 104                                  | 31                                    | 135                                    | 450                                 | 129                                  | 15 to 1                             |
| 1984                   | 130                                  | 52                                    | 182                                    | 107                                 | 144                                  | 10 to 1                             |
| 1985                   | 330                                  | 76                                    | 406                                    | 1,739                               | 157                                  | 12 to 1                             |
| 1986                   | 467                                  | 89                                    | 556                                    | 3,505                               | 165                                  | 10 to 1                             |



THE SECRETARY OF HOUSING AND URBAN DEVELOPMENT  
WASHINGTON, D.C. 20410

March 17, 1987

Honorable Carl Levin  
Chairman, Subcommittee  
on Oversight of Government Management  
Committee on Governmental Affairs  
United States Senate  
Washington, DC 20510-6250

Dear Senator Levin:

Thank you for your letter of February 20, 1987, regarding value engineering programs in the Federal Government. The Department of Housing and Urban Development does not have a value engineering program. Cost reductions are accomplished through implementation of the President's Productivity Improvement Program, economy and efficiency audits by the Inspector General, and independent efforts by Assistant Secretaries in the Department to improve programs for which they are responsible.

If you have any questions or would like additional information, please ask your staff to contact Harriet Antiporovich of the Productivity Improvement Office at 202-755-3844.

Very sincerely yours,

A handwritten signature in cursive script that reads "Samuel R. Pierce, Jr." The signature is written in dark ink and is positioned above the printed name.

Samuel R. Pierce, Jr.



## DEPARTMENT OF HEALTH &amp; HUMAN SERVICES

Office of the Secretary

Washington, D.C. 20201

MAY 13 1987

The Honorable Carl Levin  
Chairman, Subcommittee on Oversight  
of Government Management  
Committee on Governmental Affairs  
United States Senate  
Washington, D.C. 20510-6250

Dear Mr. Chairman:

This responds to your letter of February 20 to Secretary Bowen requesting information about the Department of Health and Human Services' value engineering programs.

Because of the nature of the products contracted for by this Department, we have limited opportunities to take advantage of value engineering. The enclosed response to your questions reflects the limited involvement with value engineering by the Public Health Service. The remaining contracting activities of the Department did not report any value engineering programs or savings from value engineering proposals. All HHS contracting activities do include the value engineering clause required by the Federal Acquisition Regulation in all of their contracts over \$100,000.

If you or your staff have any additional questions, please contact me (245-8870) or Terrence J. Tychan, Director, Office of Procurement and Logistic Policy (245-9801).

Sincerely yours,

Henry G. Kirschenmann, Jr.  
Deputy Assistant Secretary for  
Procurement, Assistance and  
Logistics

Enclosure

## RESPONSES TO THE VALUE ENGINEERING QUESTIONNAIRE

1. The Department of Health and Human Services (HHS) does not have a formal value engineering (VE) program.
2. The Department does not allocate funds for VE.
3. The Department does not establish VE goals.
4. Contractor-generated VE proposals resulted in the following savings during fiscal years 1981 through 1986:
 

|         |    |        |
|---------|----|--------|
| 1981--- | \$ | 0      |
| 1982--- | \$ | 0      |
| 1983--- | \$ | 0      |
| 1984--- | \$ | 76,405 |
| 1985--- | \$ | 53,303 |
| 1986--- | \$ | 11,525 |
5. VE savings were used by the programs in which the savings occurred.
6. & 7. The Department does not have any employees at any grade level assigned full time to VE.
8. The Department does not provide VE training.
9. HHS does not use contractors to perform VE in-house operations.
10. Federal Acquisition Regulation VE mandatory clauses are used in all contracts required by the FAR.  
The Department does not use any other VE provisions and has not exempted itself or its activities from any VE clauses.
11. All of the VE proposals received by the Department listed below were contractor-generated.
 

| Year | Number Received | Number Accepted |
|------|-----------------|-----------------|
| 1981 | 0               | 0               |
| 1982 | 0               | 0               |
| 1983 | 1               | 0               |
| 1984 | 4               | 4               |
| 1985 | 4               | 4               |
| 1986 | 5               | 2               |
12. The Department has no standards for processing time for VE proposals. Contractor-generated proposals are processed in range of from 45 to 60 days.
13. The Department is unaware of any subcontractor contribution to VE savings.

14. The Department made the following construction grant awards to State and local governments:

|      |              |
|------|--------------|
| 1981 | \$ 6,141,668 |
| 1982 | \$22,534,328 |
| 1983 | \$ 713,983   |
| 1984 | \$ 93,625    |
| 1985 | \$ 369,994   |
| 1986 | \$ 2,020,000 |

Federal participation in these projects averaged fifty percent.

Value engineering provisions were not included in the terms for these grants.





ASSISTANT POSTMASTER GENERAL  
Government Relations Department  
Washington, DC 20260-3500

March 17, 1987

Honorable Carl Levin  
Chairman, Subcommittee on Oversight  
of Government Management  
Committee on Governmental Affairs  
United States Senate  
Washington, D.C. 20510-6260

Dear Senator Levin:

This is in response to your February 20 letter to former Postmaster General Albert V. Casey, concerning Postal Service policy on value engineering (VE).

While the Postal Service does not have a stated policy regarding VE, the intent exists throughout our planning, budgeting and expenditure procedures. Consequently, the following answers relate to our efforts to ensure cost-effective expenditures.

1. Enclosed is a copy of the Postal Contracting Manual, Section 1, Part 19, which prescribes policies and procedures for the use of the value engineering incentive clause in Postal Service contracts.
2. Funds are not designated specifically for VE.
3. There are no established goals for VE.
4. No separate accounting of VE savings has been kept.
5. Any savings realized are applied to overall Postal Service funding.
6. There are no Postal Service employees specifically assigned to VE. However, our employees responsible for cost control perform a similar function.
7. No postal employee is assigned to VE on a full-time basis.

-2-

8. In the last five years there has been no VE training of personnel.
  9. Outside contractors have not been hired specifically for VE.
  10. The Federal Acquisition Regulations (FAR) are not applicable to the Postal Service. Reference PCM 7-104.44 (enclosed) for Postal Service clause requirements.
  11. There is no record of any VE proposals received during the stated period of time.
  12. No figures are available.
  13. No records are maintained which would provide this information.
  14. The Postal Service does not award grants to state and local governments.
- If I may be of further assistance, please let me know.

Sincerely,

  
William T. Johnstone

Enclosures



National Aeronautics and  
Space Administration  
Washington, D.C.  
20546

4-10 (Rev. 10-77)

C:\DCL\C21078f:AS7-912

MAR 12 1987

Honorable Carl Levin  
Chairman, Subcommittee on Oversight  
of Government Management  
Committee on Governmental Affairs  
United States Senate  
Washington, DC 20510

Dear Mr. Chairman:

This letter is in reply to your communication of February 19, 1987, addressed to Administrator Fletcher, requesting information on the effectiveness of value engineering (VE) programs in the Federal Government. Value Engineering, as a cost-saving technique, operates both to search for avenues of economy within an agency as well as to permit an agency to accept changes in specifications that have been suggested by contractors. Owing to NASA's unique mission, our answers will largely focus on VE in the procurement process. For purposes of clarity, each question is repeated, followed by the NASA response.

Question 1:

Does your agency have a VE program? If so, please provide any written materials describing the program.

Answer 1:

NASA has had a procurement VE program since 1970 when the Director of Procurement recognized VE in a memorandum to NASA procurement officers (see enclosure 1). More recently, the agency has specified fixed-price construction contracts and certain production-type supply contracts as appropriate for inclusion of VE clauses. (See Enclosure 2: NASA FAR Supplement coverage.)

Question 2:

Please identify the amount of funds invested in VE by your agency in each fiscal year 1981 through 1986.

Answer 2:

NASA procurement records do not maintain overall cost data on VE in agency contracts.

Question 3:

Has your agency established goals for any aspect of VE, such as savings, number of proposals, etc.? If so, please provide the goals for each fiscal year, 1981 through 1986, and show the actual accomplishment toward each goal. If VE goals are established below the agency-wide level, e.g., regions or field offices, please identify these goals and their respective sub-units.

Answer 3:

The NASA mission reflects a dynamic research and development program which offers few contractual opportunities to realize VE savings. Accordingly, NASA has established no goals for operation of the VE program in contracts.

Question 4:

What were the VE savings achieved by your agency in fiscal years 1981 through 1986? Please separate these savings by in-house savings and contractor-generated savings, if possible. If available, what was the return on investment for each of these categories?

Answer 4:

VE contractor-generated savings are not recorded centrally at NASA. While information of this nature in some cases may be available at NASA centers on an individual contract basis, a file-by-file search would be required to obtain it. However, we are able to report that a value engineering clause in the Space Shuttle External Tank contract has achieved over \$9,000,000 in savings.

Question 5:

Please describe how VE savings are reapplied, including the extent the agency component which developed the proposal benefits from the savings.

Answer 5:

With respect to in-house VE savings, NASA presently has no published policy on reapplication of VE savings or for rewarding the agency component which developed the VE proposal.

Question 6:

How many people are now assigned full time to VE in your agency? How many full-time equivalents?

Answer 6:

NASA now has no full-time personnel or full-time equivalents assigned to VE.

Question 7:

What is the highest grade or rank of any employee with full-time VE responsibilities? Please provide the name and telephone number of this employee.

Answer 7:

With respect to the highest grade or rank of the NASA employee with full-time VE responsibility, see the answer to question 6.

Question 8:

Please identify the number of people in your agency receiving eight hours or more of VE training in each fiscal year 1981 through 1986.

Answer 8:

NASA has no personnel who have received eight or more hours of VE training in fiscal years 1981 through 1986.

Question 9:

Does your agency use contractors to perform VE as part of your in-house operations? If so, please describe the extent of the contractor operation.

Answer 9:

NASA has not employed contractors to apply VE to in-house operations.

Question 10:

Is the use of Federal Acquisition Regulation VE clauses mandatory in any agency contracts? Please identify any other mandatory VE provisions applicable to your agency. Has your agency exempted itself or any particular activities or contract types from such clauses? If so, please identify such exemptions and provide a brief rationale for them.

Answer 10:

The NASA FAR Supplement (18-42.202(a)) requires the use of the FAR Value Engineering - Construction clause at FAR 48.248-3 in fixed-price construction solicitations and contracts estimated at \$100,000 or more. Contracting officers are also required to consider using the VE clause at 52.248-1 in hardware production-type fixed-price supply contracts exceeding \$1,000,000.

NASA has elected to limit its contract application of the VE program to the fixed-price construction and supply contracts described at 18-48.102. As noted above, the NASA mission is not generally accomplished through large production-type contracts which may offer

an opportunity for the application of VE techniques. NASA generally contracts for research and development and unique items in limited quantities.

Question 11:

How many VE proposals did your agency receive in each fiscal year 1981 through 1986? Please report in-house and contractor-generated proposals separately, if possible. How many in-house and contractor-generated VE proposals were approved for the same time period?

Answer 11:

The NASA data system does not record VE proposals received or approved in any fiscal year. To determine this data on a one-time basis for 1981-86 would require an extensive and time-consuming search into files at each NASA center.

Question 12:

If available, what is the average time required to process contractor-generated proposals? The average time to process in-house VE proposals? Please include any agency goals or standards associated with these processing times.

Answer 12:

NASA has no central records on the processing time for VE change proposals. Again, any data would require contributions from each field center.

Question 13:

To what extent do sub-contractor VE proposals contribute to VE savings in your agency?

Answer 13:

Subcontractor VE change proposals and their effect are not entered into agency-wide records.

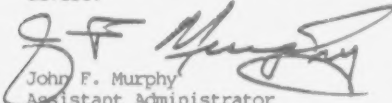
Question 14:

If your agency awards grants to states and local governments for construction projects, what was the total value of these grants for each fiscal year 1981 through 1986?

Answer 14:

NASA does not issue grants for construction projects to state and local governments.

Thank you very much for the opportunity to review NASA's implementation of the value engineering concept. We will be pleased to provide additional information if you and your subcommittee so advise.



John F. Murphy  
Assistant Administrator  
for Legislative Affairs

Enclosures





Administrator  
General Services Administration  
Washington, DC 20405

April 1, 1987

Dear Mr. Chairman:

Thank you for your letter of February 19, 1987, concerning the effectiveness of value engineering in the General Services Administration (GSA). I appreciate the goals of your committee to improve value engineering programs in the Federal Government and I fully support this and all efforts to improve the efficiency and cost effectiveness of Government operations.

In response to the fourteen specific questions set forth in your letter, we have compiled a reply consisting of the combined value engineering efforts conducted by each of the services and staff offices of GSA. We hope the attached compilation will be of assistance to you. Should you require any further information or explanation, please contact me.

With best wishes.

Sincerely,

A handwritten signature in dark ink, reading "TC Golden", is positioned above the typed name.

Terence C. Golden

The Honorable  
Carl Levin  
Chairman, Subcommittee on  
Oversight of Government Management  
United States Senate  
Washington, DC 20510

Enclosures

Enclosure

Inquiry by the Senate Committee on Governmental Affairs  
on Value Engineering

The following information is provided in response to the Senate inquiry on value engineering.

Question (1): Does your agency have a VE program? If so, please provide written materials describing the program.

Response: GSA's component organizations have had value engineering programs since the early 1970's. The programs' primary applications for GSA have been in the areas of construction and those supply items acquired on the basis of design specifications. Although GSA's construction programs have been curtailed in the past few years, and it has decreased usage of design specifications in favor of the acquisition of commercial products, an agency-wide directive, GSA Order ADM 8030.1, was issued on September 29, 1983, to provide guidelines for value engineering efforts within the agency. A copy of this directive is enclosed, as are the following issuances which provide supplemental procedures and contract clauses:

- PBS P 8010.1 - A/E-CM Value Management Services
- PBS P 8020.2 - Contract Value Incentive Clauses
- PBS P 8000.1A - Value Management

Question (2): Please identify the amount of funds invested in VE by your agency in each fiscal year 1981 through 1986.

Response: GSA invested approximately \$275,000 in value engineering for fiscal years 1981 through 1986. This figure represents the salary of one full-time GS-15 staff member who coordinated GSA value engineering activities. In addition, several individuals at various grade levels in the GSA services were involved in value engineering activities during that period on a part-time basis.

Question (3): Has your agency established goals for any aspect of VE, such as savings, number of proposals, etc.? If so, please provide the goals for each fiscal year, 1981 through 1986, and show the actual accomplishment toward each goal. If VE goals are established below the agency-wide level, e.g., regions or field offices, please identify these goals and their respective sub-units.

Response: GSA does not have established goals for value engineering. GSA Order ADM 8030.1 requires value incentive provisions in all appropriate contracts of \$100,000 or more. Internal agency value engineering studies, where appropriate, are conducted for procurements of \$1,000,000 or more.

Question (4): What were the VE savings achieved by your agency in fiscal years 1981 through 1986? Please separate these savings by in-house savings and contractor-generated savings, if possible. If available, what was the return on investment for each of these categories?

Response: The estimated savings for fiscal years 1981 through 1986 were approximately \$11.5 million and were generated by contractors. Records on in-house savings are not available.

Question (5): Please describe how VE savings are reapplied, including the extent the agency component which developed the proposal benefits from the savings.

Response: Value engineering savings realized under the GSA contract share formula would reduce the price of the contract. Savings, as a result of in-house value engineering analyses, would reduce the overall cost to the Government for that particular program.

Question (6): How many people are now assigned full-time to VE in your agency? How many full-time equivalents?

Response: GSA currently has no full-time equivalent position assigned to value engineering activities. The position formerly devoted to this activity was vacated in 1986 and has not been refilled due to staff reductions. The value engineering activities required by GSA Order ADM 8030.1 are accomplished, as needed, from resources allocated to other program areas.

Question (7): What is the highest grade or rank of any employee with full-time VE responsibilities? Please provide the name and telephone number of this employee.

Response: The highest grade level of the individual who was assigned to value engineering activities on a full-time basis was a GS-15. That individual retired from Federal service in July of 1986 and has not been replaced. Due to budgetary constraints, it is unlikely that GSA will refill this position unless there is a major increase in agency construction activities.

Question (8): Please identify the number of people in your agency receiving eight hours or more of VE training in each fiscal year 1981 through 1986.

Response: Thirteen GSA employees received value engineering training during fiscal year 1985 and twenty-seven during fiscal year 1984. We have no previous data available for the number of GSA employees trained prior to fiscal year 1984. An unspecified number have received non-structured value engineering training in GSA's regional offices. A value engineering course is required for all GSA acquisition personnel under the agency's procurement career development program.

- 3 -

Question (9): Does your agency use contractors to perform VE as part of your in-house operations? If so, please describe the extent of the contractor operation.

Response: GSA does not use contractors to perform value engineering as a part of in-house operations.

Question (10): Is the use of Federal Acquisition Regulation VE clauses mandatory in any agency contracts? Please identify any other mandatory VE provisions applicable to your agency. Has your agency exempted itself or any particular activities or contract types from such clauses? If so, please identify such exemptions and provide a brief rationale for them.

Response: GSA currently does not use the Federal Acquisition Regulation (FAR) value engineering clauses which were issued in April of 1984. Instead, GSA has secured a deviation from the FAR to continue to use its own value incentive clauses. This action was taken in recognition of the fact that the FAR value engineering clauses are currently undergoing a major revision. GSA will use the revised FAR clauses upon issuance. No further exemptions from the use of value engineering provisions have been made for any areas of GSA contracting. However, both the Federal Supply Service and the Public Buildings Service have elected to apply GSA value incentive clauses at various thresholds below \$100,000 in order to achieve maximum impact in all appropriate procurements.

Question (11): How many VE proposals did your agency receive in each fiscal year 1981 through 1986? Please report in-house and contractor-generated proposals separately, if possible. How many in-house and contractor-generated VE proposals were approved for the same time period?

Response: The number of value engineering proposals that may have been received in GSA from fiscal years 1981 through 1986 are unknown. No meaningful data is available to answer this question.

Question (12): If available, what is the average time required to process contractor-generated VE change proposals? The average time to process in-house VE proposals? Please include any agency goals or standards associated with these processing times.

Response: Insufficient data is available to determine the time required to process in-house value engineering proposals. The estimated average time required to process contractor generated proposals is thirty days.

Question (13): To what extent do subcontractor VE proposals contribute to VE savings in your agency?

- 4 -

Response: Subcontractors participate in value engineering in relation to the proportion of contract work for which they are responsible. This varies considerably, but on most Public Buildings Service construction projects exceeds fifty percent.

Question (14): If your agency awards grants to states and local governments for construction projects, what was the total value of these grants for each fiscal year 1981 through 1986?

Response: GSA does not have a grant program.



United States Department of the Interior

OFFICE OF THE SECRETARY  
WASHINGTON, D.C. 20240

JAR 13 1987

Honorable Carl Levin  
Chairman, Subcommittee on  
Oversight of Government Management  
Committee on Governmental Affairs  
U.S. Senate  
Washington, D.C. 20510-6250

Dear Mr. Chairman:

The information requested in your letter of February 20, 1987,  
regarding the Department's value engineering (VE) activities is  
enclosed. I hope this information is useful to the Subcommittee in  
its future hearing on VE programs.

Sincerely,

*Joseph W. Correll*  
Joseph W. Correll  
Principal Deputy Assistant Secretary -  
Policy, Budget, and Administration

Enclosures

## DEPARTMENT OF THE INTERIOR VALUE ENGINEERING PROGRAM

1. Does your agency have a VE program? If so, please provide any written materials describing the program.

Within the Department of the Interior, only the Bureau of Reclamation has a VE program. The program was established in fiscal year 1984 and is described in the enclosed Bureau of Reclamation Instructions.

The information contained in the answers to questions 2 through 9 and 11 through 13 pertains only to the Bureau of Reclamation.

2. Please identify the amount of funds invested in VE by your agency in each fiscal year 1981 through 1986.

|                       |           |
|-----------------------|-----------|
| Fiscal Year 1981-1983 | \$0       |
| Fiscal Year 1984      | \$125,000 |
| Fiscal Year 1985      | \$200,000 |
| Fiscal Year 1986      | \$100,000 |

3. Has your agency established goals for any aspect of VE, such as savings, number of proposals, etc.?

Goals have not been established. However, it is the policy of the Bureau of Reclamation's Engineering and Research Center to require conduct of a VE study as part of every engineering design unless documented justification is provided for not conducting such a study.

4. What were the VE savings by your agency in fiscal years 1981 through 1986? Please separate these savings by in-house savings and contractor-generated savings, if possible. If available, what was the return on investment for each of these categories?

## In-house VE savings:

|                       |             |
|-----------------------|-------------|
| Fiscal Year 1981-1983 | \$0         |
| Fiscal Year 1984      | \$2,000,000 |
| Fiscal Year 1985      | \$125,000   |
| Fiscal Year 1986      | \$5,000,000 |

## Contractor-generated VE savings:

|                       |           |
|-----------------------|-----------|
| Fiscal Year 1981-1983 | \$0       |
| Fiscal Year 1984      | \$29,000  |
| Fiscal Year 1985      | \$148,000 |
| Fiscal Year 1986      | \$58,000  |

The return on investment is not available, but VE savings exceed the costs invested in VE. Cost savings resulting from a single VE study usually exceed the cost of a full year of VE training and operation.

5. Please describe how VE savings are reapplied, including the extent the agency component which developed the proposal benefits from the savings.



VE savings are not reapplied since such action is not possible under the accounting procedures used by the Bureau of Reclamation. However, savings are realized through reduced construction costs which result in lower costs to be repaid by water and power users.

6. How many people are now assigned full time to VE in your agency?  
How many full-time equivalents?

One person is assigned to VE in a position identified as "Value Engineer." However, the VE program does not require full-time effort so this person has additional duties and responsibilities. Six persons in regional offices spend approximately ten percent of their time on VE activities (.6 full-time equivalents).

7. What is the highest grade or rank of any employee with full-time equivalent VE responsibilities? Please provide the name and telephone number of this employee.

The employee is classified as a GM-13. His name is Mr. Gary. L. Long and his telephone number is (303) 236-8550.

8. Please identify the number of people in your agency receiving eight hours or more of VE training in each fiscal year 1981 through 1986.

|                       |     |
|-----------------------|-----|
| Fiscal Year 1981-1983 | 0   |
| Fiscal Year 1984      | 65  |
| Fiscal Year 1985      | 414 |
| Fiscal Year 1986      | 33  |

9. Does your agency use contractors to perform VE as part of your in-house operations? If so, please describe the extent of the contractor operation.

The Bureau of Reclamation has used contractors to conduct VE training. The training was performed by Certified Value Specialists using a curriculum or agenda approved by the Society of American Value Engineers.

10. Is the use of Federal Acquisition Regulation VE clauses mandatory in agency contracts? Please identify any other mandatory VE provisions applicable to your agency. Has your agency exempted itself or any particular activities or contract types from such clauses?

Use of Federal Acquisition Regulation (FAR) VE clauses is mandatory in all Department of the Interior contracts as prescribed in FAR Subpart 48.2. There are no other mandatory VE provisions and the Department has not exempted any activities or contract types from VE clauses prescribed by the FAR.

11. How many VE proposals did your agency receive in each fiscal year 1981 through 1986? Please report in-house and contractor-generated proposals separately, if possible. How many in-house and contractor-generated VE proposals were approved for the same time period?

## VE proposals received in-house

Fiscal Year 1981-1983 0  
 Fiscal Year 1984 4 (1 implemented)  
 Fiscal Year 1985 10 (2 partially implemented)  
 Fiscal Year 1986 3 (1 implemented)

## Contractor-generated VE proposals

Fiscal Year 1981-1983 0  
 Fiscal Year 1984 5 (all approved)  
 Fiscal Year 1985 18 (14 approved)  
 Fiscal Year 1986 7 (6 approved)

12. If available, what is the average time required to process contractor-generated VE change proposals? The average time to process in-house VE proposals?

Within the Bureau of Reclamation, 30 to 45 days is required to process contractor-generated VE change proposals and approximately 6 weeks is required for in-house VE proposal processing.

13. To what extent do subcontractor VE proposals contribute to VE savings in your agency?

Within the Bureau of Reclamation, very few VE proposals are submitted by subcontractors.

14. If your agency awards grants to states and local governments for construction projects, what was the total value of these grants for each fiscal year 1981 through 1986? What percentage of the total cost for such projects was paid by the federal grant? Were any VE provisions included in such grants?

Fiscal Year 1981 \$271,558,120  
 Fiscal Year 1982 \$126,018,202  
 Fiscal Year 1983 \$295,544,594  
 Fiscal Year 1984 \$357,710,399  
 Fiscal Year 1985 \$302,582,934  
 Fiscal Year 1986 \$212,074,636

The percentage of the total costs paid by the federal grant varies from 53 to 100 depending on the grant program. We were not able to determine whether VE provisions were included in the grants. The information above excludes Fish and Wildlife grant programs as construction funds for these projects cannot be separately identified.



THE SECRETARY OF ENERGY  
WASHINGTON, D.C.

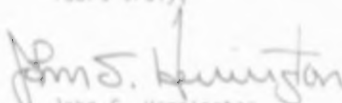
April 7, 1987

Dear Mr. Chairman:

In response to your letter of February 19, 1987, we have completed a review of information from our field organizations concerning the Department of Energy's value engineering program. Enclosure "A" provides responses to your questions. Due to the decentralized management policies employed by the Department of Energy, the degree of value engineering activity varies significantly among our field organizations. The most extensive program exists at the Albuquerque Operations Office, which has principal responsibility for the production of weapons.

If you desire further information at the field office level of detail, individual responses can be provided. Thank you for your interest in our management activities.

Yours truly,

  
John S. Herrington

Enclosure

Honorable Carl Levin  
Chairman, Subcommittee on Oversight  
of Government Management  
United States Senate  
Washington, DC 20510-6250

cc:  
Honorable William S. Cohen  
Ranking Minority Member  
Subcommittee on Oversight of  
Government Management  
United States Senate  
Washington, DC 20510

## DEPARTMENT OF ENERGY

Value Engineering - Senator Levin's Request

Question 1: Does your agency have a value engineering (VE) program? If so, please provide any written materials describing the program.

Response 1: The Department of Energy (DOE) has not promulgated a Departmental policy concerning VE programs. The predominant mission activities performed by DOE contractors consist of management and operation of nuclear weapon production facilities and research and development activities on the cutting edge of defense and energy technologies. VE precepts do not lend themselves easily to procurements involved with these activities especially in DOE's present mode in which production schedules have been dramatically accelerated. For construction, however, various DOE field organizations have developed VE programs to suit the type of contractual arrangement they have with their management and operating contractors. The DOE, at the Headquarters level, has not promulgated policy for VE in construction because accountability for design and construction is decentralized to its field organizations. Some DOE field organizations have initiated VE activities in their construction programs while others have not. Field organizations are encouraged to utilize VE in their design and construction programs where there may be a return on the investment.

Question 2: Please identify the amount of funds invested in VE by your agency in each FY 1981 through 1986.

Response 2: The amount of funds invested by DOE is as follows:

|          |           |
|----------|-----------|
| FY 1981: | \$22,000  |
| FY 1982: | \$39,000  |
| FY 1983: | \$118,000 |
| FY 1984: | \$36,000  |
| FY 1985: | \$185,000 |
| FY 1986: | \$152,000 |

Question 3: Has your agency established goals for any aspect of VE, such as savings, number of proposals, etc.? If so, please provide the goals for each FY 1981 through 1986, and show the actual accomplishment toward each goal. If VE goals are established below the agency-wide level; e.g., regions or field offices, please identify these goals and their respective sub-units.

Response 3: The DOE encourages the use of VE at its field organizations as one of the better methodologies to systematically evaluate alternatives, but has not established specific goals for the program.

Question 4: What were the VE savings achieved by your agency in FY 1981 through 1986? Please separate these savings by in-house savings and contractor-generated savings, if possible. If available, what was the return on investment for each of these categories?

Response 4: The VE savings achieved in-house and by contractors are as follows:

|         | Est. Savings<br>In-House | Est. Savings<br>Contractor |
|---------|--------------------------|----------------------------|
| FY 1981 | \$ 0                     | \$ 0                       |
| FY 1982 | 0                        | 105,300                    |
| FY 1983 | 0                        | 860,100                    |
| FY 1984 | 650,000                  | 90,000                     |
| FY 1985 | 3,750,000                | 361,100                    |
| FY 1986 | \$13,150,000             | \$2,778,000                |

We cannot estimate the return on investment for each of these categories because that is not readily determinable from the information provided to us.

Question 5: Please describe how VE savings are reapplied, including the extent the agency component which developed the proposal benefits from the savings.

Response 5: Generally, field organizations reapply or reprogram VE savings to other approved projects or programs.

Question 6: How many people are now assigned full-time to VE in your agency? How many full-time equivalents?

Response 6: There are no full-time DOE or contractor personnel assigned to VE. It is the duty and obligation of each and every DOE and contractor employee to identify cost-saving opportunities. Based on the responses provided by field organizations, there are approximately six full-time equivalents involved with VE.

Question 7: What is the highest grade or rank of any employee with full-time VE responsibilities? Please provide the name and telephone number of this employee.

Response 7: Since there are no employees with full-time VE responsibilities, the question does not apply. However, the highest graded individual with direct VE responsibilities is a GM-14: John T. Guiney, Facilities and Construction Management Division, Albuquerque Operations Office, FTS 844-9111.

Question 8: Please identify the number of people in your agency receiving 8 hours or more of VE training in each FY 1981 through 1986.

Response 8: Six DOE project engineers had formal training in VE in FY 1985. Approximately, 59 Department of Energy personnel received either 24- or 40-hour workshops on the subject in FY 1986.

Question 9: Does your agency use contractors to perform VE as part of your in-house operations? If so, please describe the extent of the contractor operation.

Response 9: For the three DOE field organizations who responded positively to the existence of a formal VE program (Albuquerque, Idaho, and Nevada Operations Offices) contractors perform a variety of functions. Both VE consultants and operating contractors perform VE studies. VE consultants and universities have been contracted to provide certified VE training and management briefings. For other DOE field organizations, functional analysis review or similar VE techniques are performed by operating contractors in the normal course of design and construction to a greater or lesser degree. This is true for the San Francisco, Oak Ridge, Savannah River, Richland and Chicago Operations Offices. The San Francisco Operations Office is in the process of formalizing its VE program with its operating contractors.

Question 10: Is the use of Federal Acquisition Regulation VE clauses mandatory in any agency contracts? Please identify any other mandatory VE provisions applicable to your agency. Has your agency exempted itself or any particular activities or contract types from such clauses? If so, please identify such exemptions and provide a brief rationale for them.

Response 10: The use of Federal Acquisition Regulation VE clauses is not mandatory in DOE contracts, nor are there any other mandatory VE provisions applicable to the agency. DOE has not specifically exempted itself or any particular activities from VE clauses although, as stated above, VE precepts do not easily lend themselves to nuclear weapons production or research and development. To a limited extent, the cost plus award fee (CPAF) contract type acts to provide savings incentives to the agency. Most of the contracts for operating nuclear weapons production facilities are CPAF-type contracts. A number of field organizations have installed the VE clause in their construction contracts.

Question 11: How many VE proposals did your agency receive in each FY 1981 through 1986? Please report in-house and contractor-generated proposals separately, if possible. How many in-house and contractor-generated VE proposals were approved for the same time period?

Response 11: An examination of the field organization's responses provided the following total amounts:

| <u>FY</u> | <u>In-house<br/>Received</u> | <u>In-house<br/>Approved</u> | <u>Contractor<br/>Received</u> | <u>Contractor<br/>Approved</u> |
|-----------|------------------------------|------------------------------|--------------------------------|--------------------------------|
| 1981      | 0                            | 0                            | 9                              | 9                              |
| 1982      | 0                            | 0                            | 10                             | 10                             |
| 1983      | 0                            | 0                            | 10                             | 10                             |
| 1984      | 1                            | 1                            | 4                              | 4                              |
| 1985      | 2                            | 2                            | 5                              | 5                              |
| 1986      | 13                           | 13                           | 18                             | 18                             |

Question 12: If available, what is the average time required to process contractor-generated VE change proposals? The average time to process in-house VE proposals? Please include any agency goals or standards associated with these processing times.

Response 12: We have insufficient data regarding contractor-generated proposals. For one of our field organizations, in-house proposals are processed within 90-120 days of receipt. Apparently, 90-120 days works well within the overall design schedules for that organization.

Question 13: To what extent do subcontractor's VE proposals contribute to VE savings in your agency?

Response 13: We have insufficient data regarding subcontractor's proposals. For one of our field organizations, savings total roughly \$100,000 since 1982.

Question 14: If your agency awards grants to States and local Governments for construction projects, what was the total value of these grants for each FY 1981 through 1986? What percentage of the total cost for such projects was paid by the Federal grant? Were any VE provisions included in such grants? If so, please describe these provisions and state what savings, if any, were realized, and how they were reapplied.

Response 14: Upon examining those field organizations who award such grants, VE was not included.



Office of the  
Administrator  
of Veterans Affairs

Washington DC 20420



Veterans  
Administration

MAR 26 1987

In Reply Refer To:

Honorable Carl Levin  
Chairman, Subcommittee on Oversight  
of Government Management  
Committee on Government Affairs  
United States Senate  
Washington, D.C. 20510-6250

Dear Mr. Chairman:

Thank you for your letter of February 20, 1987, relative to Veterans Administration (VA) Value Engineering (VE) program. Our response is presented in the same sequential order as requested in your letter.

(1) VA Office of Facilities has an active VE program for the design and construction of major facilities. There is a VE analysis at each stage of a major project, including preliminary and working drawing design, and during construction. In addition to our in-house staff, we retain VE Consultants to assist the VE effort for large projects such as replacement hospitals. Our construction contractors are encouraged, by a Federal Acquisition Regulation clause in the contract, to submit value engineering change proposals and share in the savings. We have no formal publication on our VE program. Although our field stations also award design and construction contracts, they have no formal VE program. With the recent establishment of the Office of Facilities as the agency element responsible for all design and construction, we anticipate an active VE effort at our field stations also.

(2) Total funds invested including fees for VE by in-house staff and VE consultants by calendar year:

|      |           |
|------|-----------|
| 1981 | \$339,000 |
| 1982 | \$342,000 |
| 1983 | \$325,000 |
| 1984 | \$300,000 |
| 1985 | \$489,000 |
| 1986 | \$188,000 |

"America is #1—Thanks to our Veterans"

Honorable Carl Levin

(3) The VA follows the generally accepted goal to reduce construction cost by ten dollars for each dollar invested in VE. As described in our response to question (4), savings have usually exceeded this goal.

(4) Savings during 1981 to 1986 follow:

| CALENDAR<br>YEAR | IN-HOUSE | VALUE ENGINEERING<br>CONSULTANTS | *VECP     | TOTAL    |
|------------------|----------|----------------------------------|-----------|----------|
| 1981             | \$ 2.8M  | ----                             |           |          |
| 1982             | \$14.4M  | ----                             | \$ 98,000 | \$ 2.898 |
| 1983             | \$ 3.6M  | \$3.3M                           | \$252,600 | \$17.952 |
| 1984             | \$ 7.4M  | \$1.9M                           | \$ 15,600 | \$ 5.515 |
| 1985             | \$ 4.9M  | \$0.5M                           | \$ 3,500  | \$ 7.903 |
| 1986             | \$ 7.1M  | ----                             | \$ 61,500 | \$ 4.961 |
|                  |          | \$0.9M                           | -----     | \$ 8.0M  |

\*Value Engineering Change Proposal submitted by the construction contractor.

The ratio of savings to funds invested is as follows:

|      |                           |   |                  |
|------|---------------------------|---|------------------|
| 1981 | <u>2.898M</u><br>339,000  | " | <u>8.5</u><br>1  |
| 1982 | <u>17.952M</u><br>342,000 | " | <u>52.5</u><br>1 |
| 1983 | <u>5.515M</u><br>125,000  | " | <u>17.0</u><br>1 |
| 1984 | <u>7.903M</u><br>300,000  | " | <u>26.3</u><br>1 |
| 1985 | <u>4.961M</u><br>489,000  | " | <u>10.1</u><br>1 |
| 1986 | <u>8.0M</u><br>133,000    | " | <u>42.5</u><br>1 |

Honorable Carl Levin

(5) VE assists our designers to meet budget limitations and assure efficient, cost-effective facilities. Savings are achieved through lower bids and are transferred to our Working Reserve Fund and applied to other projects as needed through reprogramming. If an accepted VE proposal is judged applicable to future projects, VA design standards are modified to incorporate the VE proposal. This results in repeated savings on subsequent projects. The agency component which developed the VE proposal benefits by having a state-of-the-art, cost-effective design. For example, until 1979, VA was providing shielding against radio frequency interference (RFI) in electro-encephalographic (EEG) suites and neurosurgical operating rooms. This shielding cost up to \$70,000 per room. A VE study was conducted in cooperation with the Bureau of Radiological Health of the Food and Drug Administration. The study determined that modern improvements in equipment, coupled with proper attention to the location of nearby internal and external sources of RFI, and natural shielding provided within the building could eliminate much of the need for RF shielding. Shielding can now be provided where needed for less than \$5,000 per room. Our construction standard has been modified to achieve repeated savings from this VE study. Similarly, our VE effort encourages the use of double glazed windows and enclosed courtyards where appropriate to reduce energy costs. In addition, improved functioning and reduced maintenance cost are among our VE objectives.

(6) Five FTE positions are assigned to the VE staff in the Office of Facilities.

(7) Roland R. Plante is the Chief of our Value Analysis Division. He is a GM-14 and his telephone number is 233-3342.

(8) One member of the Value Analysis staff attended a 40 hour workshop on Value Engineering in 1981. No other people in the Office of Facilities attended eight hours or more of formal VE training. Our VE staff maintains proficiency in VE by working closely with the VE consultants, and through attendance at expositions on new materials and methods. Our VE staff also conducted a four hour training session, in 1981 and 1983, for architects and engineers in the Office of Facilities. Another four hour training session is to be conducted in May.

Honorable Carl Levin

(9) Value Engineering consultants provide VE services on large projects such as replacement hospitals. The consultant conducts VE studies with our in-house staff during preliminary development and again during working drawings. Consultants perform VE reviews, identify high cost systems or components, and recommend alternative design solutions that would reduce cost or improve design. The studies in preliminary design are conducted to determine the most appropriate major systems for the project based upon life cycle cost. These include the selection of construction materials, and heating and cooling systems. The studies in the working drawing phase concentrate on small components. Recommendations are submitted to VA for review and approval.

(10) VA uses the Federal Acquisition Regulation VE clause in all construction contracts of \$100,000 or more. There are no other VE provisions in our construction contracts. VA has not requested an exemption to the clause from the Civilian Acquisition Council.

(11) VE proposals received and approved during 1981 to 1986:

|      | VECP     |          | In-House |          |
|------|----------|----------|----------|----------|
|      | Received | Approved | Received | Approved |
| 1981 | 17       | 11       | Estimate | 55       |
| 1982 | 11       | 6        | Four     | 140      |
| 1983 | 5        | 3        | Received | 50       |
| 1984 | 3        | 1        | For each | 64       |
| 1985 | 7        | 5        | One      | 27       |
| 1986 | --       | --       | Approved | 67       |

(12) We established a two-week schedule for evaluation of Value Engineering Change Proposals (VECP) and have met this schedule in all instances where the contractor has provided the information needed to evaluate the proposal. Whereas a VECP is an offer to change a completed design under construction, in-house proposals affect systems or components which are in design. We allow more time for these evaluations, and the average response time is about three weeks.

(13) During 1981 to 1986, sub-contractor VE proposals constituted 72 percent of the VECPs approved.

Honorable Carl Levin

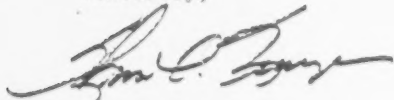
(14) The VA awards grants to states for construction of State Grant Nursing Homes. The grants have been between 60 and 65 percent of total construction cost. The amount of the grants follows:

|      |         |
|------|---------|
| 1981 | \$10.7M |
| 1982 | \$11.4M |
| 1983 | \$ 9.5M |
| 1984 | \$13.1M |
| 1985 | \$39.3M |
| 1986 | \$35.5M |

There are no VE provisions in these grants. The state grant nursing home construction standards are included in CFR 17-170 to 17-177. The VA is presently reviewing the standards and is considering inclusion of a VE incentive clause.

Your interest in our VE program is appreciated.

Sincerely,



THOMAS K. TURNAGE  
Administrator



U.S. Department of  
Transportation

Assistant Secretary  
for Administration

400 Seventh St. S.W.  
Washington, D.C. 20590

APR - 8 1987

The Honorable Carl Levin  
Chairman, Subcommittee on Oversight  
of Government Management  
United States Senate  
Washington, D.C. 20510-6250

Dear Senator Levin:

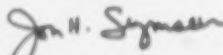
The Secretary has asked me to respond to your letter of February 19, 1987, regarding information on the Department's use of value engineering (VE) in its various programs. For the past several years, three major elements of the Department have had VE programs, the Federal Highway Administration (FHWA), the Urban Mass Transportation Administration (UMTA) and the United States Coast Guard (USCG). Savings have varied over the years but in 1986 the projected savings from FHWA's VE training workshops with State highway departments, FHWA's direct Federal construction, UMTA's transit grant program, and the USCG's shore facility VE program totaled some \$60 million.

In an attempt to implement a more systematic VE process with the Department and capture data on the results of VE reviews, a draft Department-wide Order on Value Engineering has just been completed. The Order establishes policies and responsibilities for the use of VE in the Department's direct construction and grant programs. In addition, we will be able to collect data and information on the number of VE reviews conducted, the amount of savings realized, and the extent of VE training. Enclosed is a copy of the final draft Order (Enclosure A) which we expect to formally issue within a month.

While the responses to the 14 questions in your letter vary substantially because of the differences in the programs administered by the organizations in DOT, we have grouped and summarized our answers for the USCG, UMTA, and FHWA under Enclosure B. Written material describing these three programs can be found under Enclosure C.

We trust this information will be of assistance to you and your Subcommittee in preparation for your hearing this spring. If you have any questions or require additional information, please feel free to contact me.

Sincerely,

  
Jon H. Seymour

Enclosures

Enclosure B

U.S. Department of Transportation  
Answer to Senator Levin's Questions on Value Engineering (VE)

During the past several years, Value Engineering (VE) has been used with varying degrees of success in the Department. Savings as a result of VE were achieved primarily in the Federal Highway Administration, (FHWA), the United States Coast Guard (USCG) and the Urban Mass Transportation Administration (UMTA). In the direct construction program, VE has been used in the design and construction phases. In the grant construction program, the effort has been one of education to encourage voluntary participation on the part of grantees. VE has been applied to a lesser extent in FAA, St. Lawrence Seaway and MARAD. For example, because of the potential impact on safety, FAA has established strict design and engineering standards in its direct construction program and grants to airport authorities which allow for very limited application of VE procedures. In the case of MARAD, a lack of subsidized vessel constructions in recent years has provided little opportunity for the application of VE in its programs and the St. Lawrence Seaway may have only one major project (rehabilitation of the Eisenhower and Snell Locks) which may be subject to VE if funding is provided.

Though the various elements of the Department have developed and issued guidelines and operating procedures for accomplishing VE, no Departmental guidance existed for defining broad program responsibility or for collecting the kind of precise data requested in the following questions.

In an attempt to implement a more systematic VE process within the Department and capture data on the results of those reviews, a draft Department-wide Order on Value Engineering has just been completed. The Order establishes policies and responsibilities for the use of VE in the Department's direct construction and grant programs. Recognizing the significant differences between the kinds of projects in which the administrations apply VE techniques, each administration is required to issue implementing directives which would define the type of project and at what stage of project development VE should be applied. In addition, we will be able to collect data and information on the number of VE projects undertaken, the amount of savings realized, and the extent of VE training. We expect to issue the final order within the next month.

Since this order has not been issued, the responses to questions 2, 4, 6, 11, and 14 are only estimates. The new order will provide consistent definitions of VE and allow us to collect more precise data in the future.



- 2 -

As our estimates indicate, our experience with VE has been positive, but it must be viewed in the context of some practical restrictions. First, the use of VE is somewhat constrained in transportation construction. Airport pavements are intentionally designed to handle dynamic loads that exceed conceivable exposure, as are highway bridges and fixed guideway rail systems. Second, certain projects do not lend themselves to direct application of VE, e.g., repaving an existing road. Third, most DOT construction funds are expended through intergovernmental programs where other jurisdictions initiate and manage projects.

With these constraints in mind, the following information is provided:

QUESTION 1: Does your agency have a VE program? If so, please provide any written material describing the program.

ANSWER:

USCG - Yes. Material in Enclosure C.

UMTA - Yes. Material in Enclosure C.

FHWA - Yes. FHWA has a Direct Federal Construction program and a voluntary program for Federal-aid work performed by the States. VE is one of FHWA's 1987 emphasis areas in the Direct Federal program. A Direct Federal Manual chapter is being prepared to document the Direct Federal VE process in accordance with the anticipated DOT Order on VE. See material in Enclosure C.

QUESTION 2. Please identify the amount of funds invested in VE by your agency in each Fiscal Year 1981 through 1986.

ANSWER:

USCG - Information on private contractor cost is available only for FY 84-FY 86. Exact information on in-house costs is unavailable. However, assuming that approximately three FTE are used on in-house studies, we estimate the following costs:

|                | <u>FY 84</u> | <u>FY 85</u> | <u>FY 86</u> |
|----------------|--------------|--------------|--------------|
| Contract Costs | \$90K        | \$60K        | \$56K        |
| In-House Costs | \$85K        | \$90K        | \$125K       |

UMTA - Estimated costs are available only for FY 1983 through FY 1986, and are shown below.

|                | <u>FY 83</u> | <u>FY 84</u> | <u>FY 85</u> | <u>FY 86</u> |
|----------------|--------------|--------------|--------------|--------------|
| Contract Costs | \$40,000     | \$140,000    | \$471,000    | \$70,000     |
| FTE Costs      | \$110,000    | \$110,000    | \$110,000    | \$110,000    |

- 3 -

FHWA - Exact information is not available. Direct annual costs for FHWA's VE Coordinator are estimated at \$160,000 for his salary and travel, and the cost of presenting 12 VE workshops a year. FHWA also estimates that 4 FTE (individuals performing VE functions as collateral duty) are expended annually in the field for VE reviews, averaging an additional \$200,000 annually. Other Federal costs not estimated here include trainee travel, travel for State officials, and Preliminary Engineering funds spent by the States on VE. Note that the vast majority of personnel resources used in VE studies in the Federal-aid highway program comes from the States. A VE review may involve 4 to 7 State employees for several days, which represents a substantial number of staff years invested in VE by the States.

**QUESTION 3:** Has your agency established goals for any aspect of VE, such as savings, number of proposals, etc.? If so, please provide the goals for each fiscal year, 1981 through 1986, and show the actual accomplishment toward each goal. If VE goals are established below the agency-wide level, e.g., regions or field offices, please identify these goals and the respective sub-units.

**ANSWER:**

USCG - A VE clause is included in construction contracts over \$500,000. In addition, the goal is to use VE in the design phase on all shore facilities that may yield savings or improvements. On projects costing between \$500,000 and \$2 million, the design phase VE is done in-house; for projects costing over \$2 million, it is done by contract. The Coast Guard required VE on all projects over \$20,000 until 1984, but found that the return did not justify the added cost on smaller projects. Consequently, the threshold was raised to \$500,000 in 1985. The Coast Guard also solicited vendor input to its 110-foot patrol boat design before advertising for construction. Though this is not "VE" in the traditional sense, it is a valuable peer review that constitutes one more effort by the Coast Guard to assure that it uses the most cost-effective techniques in construction.

UMTA - Establishing meaningful VE goals in grant programs is very difficult, since other jurisdictions initiate all projects. UMTA's basic goal is to use VE on projects which may yield savings or improvements. UMTA requires VE on all new starts over \$150 million, but also uses VE on less costly projects on a selective basis, when the project's complexity indicates that VE can be productive.

FHWA - FHWA has had a substantial VE training program for FHWA and State personnel. This is a major strategy in FHWA's primary goals: (1) ensure that VE is applied to Direct Federal projects; and (2) encourage States to use VE voluntarily. FHWA believes voluntary use by most States will be more effective than mandated VE procedures; about 35 States now use VE

- 4 -

in varying degrees, including most larger States. AASHTO now actively promotes VE to the States and will sponsor a national conference on VE this summer. However, establishing a meaningful VE goal in the Federal-aid highway grant program is very difficult, since the States initiate all projects. More explicit goals for FHWA's Direct Federal activities will be addressed in new Direct Federal VE procedures.

The variations in these thresholds reflect the differences in the types of projects undertaken by the Coast Guard, FHWA and UMTA. A uniform criterion applied to all Operating Administrations could not reflect these differences.

**QUESTION 4:** What were the VE savings achieved by your agency in fiscal years 1981 through 1986? Please separate these savings by in-house savings and contractor-generated savings, if possible. If available, what was the return on investment for each of these categories?

**ANSWER:**

USCG - Information is available only for FY 84-FY 86, as shown below. The higher savings in FY 1985 resulted primarily from one project in which a pier was to be replaced. A contractor identified pylons that could be salvaged, and redirected the project to rehabilitation and deck replacement. The Coast Guard saved \$3.3 million in FY 1984, \$8.6 million in FY 1985, and \$4.5 million in FY 1986. Below are contractor-generated and in-house savings (in millions of dollars), and return on investment:

|                              | <u>FY 84</u> | <u>FY 85</u> | <u>FY 86</u> |
|------------------------------|--------------|--------------|--------------|
| Contractor Generated Savings | \$1.5M       | \$2.8M       | \$2.6M       |
| Savings to Investment Ratio  | 17:1         | 47:1*        | 46:1         |
| In-house Savings             | \$1.8M       | \$5.8M       | \$1.9M       |
| Savings to Investment Ratio  | 21:1         | 64:1         | 15:1         |

\*Higher ratio due partly to large VE savings on one project.

UMTA - Except for a small number of VE demonstrations funded in FY 1983, UMTA does not undertake VE directly. That is done by grantees. The demonstration program saved an estimated \$12.1 million in FY 1983.

The data provided below are estimates of the savings achieved through the grant program:

|                      | <u>FY 81</u> | <u>FY 84</u> | <u>FY 85</u> | <u>FY 86</u> |
|----------------------|--------------|--------------|--------------|--------------|
| Savings              | \$ 9.0       | \$25.7       | \$92.1       | \$16.0       |
| Return on Investment | 61:1         | 103:1        | 161:1        | 89:1         |

Measured in dollar value of recommendation accepted per dollar expended in VE, and assumes the cost of two FTE.

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FHWA - Records of total VE savings by the States are not maintained by the FHWA. However, we expect to identify cost savings through procedures we will be initiating under the proposed new DOT Order. We do have the following input on potential savings derived from our training workshops and Direct Federal efforts. Savings are shown in thousands of dollars. Return on investment is not shown because we have no way of developing a reasonable estimate of State costs, which constitute the large majority of costs.

VE Savings: FHWA  
(\$1,000)

|                             | <u>FY 81</u> | <u>FY 82</u> | <u>FY 83</u> | <u>FY 84</u> | <u>FY 85</u> | <u>FY 86</u> |
|-----------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Training Workshop Proposals | \$185,408    | 55,523       | 134,943      | 106,062      | 47,168       | 39,345       |
| Direct Federal In House     | \$300        | 350          | 360          | 0            | 100          | 113          |
| Direct Federal Contractor   | \$ 85.3      | 18           | 103          | 123.9        | 46.2         | 32           |

FHWA's training workshops include mostly State highway personnel, usually 25 to 40 per workshop. In-house savings are difficult to quantify. It is often difficult to determine where normal design process savings end and VE savings begin. Contractor-generated savings reflect only those resulting from formal VE submission.

QUESTION 5: Please describe how VE savings are reapplied, including the extent the agency component which developed the proposal benefits from the savings.

ANSWER:

USCG - VE savings can only be reapplied where there are similar projects or designs. In recent years most projects and designs have been relatively few in number and have been dissimilar. Where there is similarity in projects which have VE potential, the VE recommendations are incorporated in project planning and design by internal reviews at the field level. Any savings are reprogrammed to higher priority project requirements on Coast Guard-wide basis.

UMTA - All savings are retained by the appropriate program account, i.e., formula grants or discretionary grants.

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FHWA - Value Engineering savings realized on Federal-aid highway projects are returned to the unobligated balance of Federal-aid funds for the particular State involved. These funds are available for expenditure on other Federal-aid projects in the same State. Direct Federal VE savings are returned to the program from which they were authorized and used on other projects in that program. A proposing agency component receives no direct benefit. A proposing contractor keeps a portion of the savings on contractor generated proposals in accordance with the FAR.

**QUESTION 6:** How many people are now assigned full-time to VE in your agency? How many full-time equivalents (FTE)?

**ANSWER:**

USCG - One person and one FTE is assigned full-time VE in the Coast Guard. However, other personnel at Headquarters and in the field perform VE duties as a collateral function for in-house studies on direct construction.

UMTA - Headquarters employees in Grants Management and R&D, and, in most cases, two employees in each region dedicate part of their time to VE activities. On average, this would account for about two FTE per year, but can in fact be higher whenever VE becomes the source of some controversy in a given project.

FHWA - One person is assigned full-time to VE, and one person in each Region and Division Office spend about five percent of their time on VE as collateral duty. The sum of the VE work done by these individuals is approximately four FTE.

**QUESTION 7:** What is the highest grade or rank of any employee with full-time VE responsibilities? Please provide the name and telephone number of this employee.

**ANSWER:**

USCG - GS-13 is the highest grade employee with full-time VE responsibilities. Inquiries or contacts concerning VE should be directed to Robert Greggs on 267-1922.

UMTA - No full time employees are assigned VE responsibility in UMTA. Headquarters and field employees who dedicate part of their time to VE range in grades from GS-13 to GS-15. Inquiries should be directed to Douglas Kerr, on 366-2440.

FHWA - Bruce Lind, VE Coordinator, GM-14, FTS 366-4631.

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**QUESTION 8:** Please identify the number of people in your agency receiving eight hours or more of VE training in each fiscal year 1981 through 1986.

**ANSWER:**

USCG - Four employees have been trained each year from FY 1981 through FY 1986, and some Headquarters and field personnel had received formal VE training before joining the Coast Guard.

UMTA - Four employees were trained in 1984.

FHWA - FHWA's VE workshop is 40 hours; the number of FHWA personnel trained in VE is shown below. FHWA has essentially completed the major training requirements, and now maintains in-house skills in VE. We estimate that approximately 35 FHWA employees will be trained in FY 1987. However, since VE studies on Federal-aid projects are done mostly by State highway personnel, the number of State and local participants is shown as well.

|                | <u>FY 81</u> | <u>FY 82</u> | <u>FY 83</u> | <u>FY 84</u> | <u>FY 85</u> | <u>FY 86</u> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|
| FHWA Staff     | 70           | 91           | 126          | 22           | 13           | 6            |
| State & Others | 428          | 200          | 572          | 501          | 256          | 134          |

The above FHWA data represents about 10 percent of all agency personnel. Many more were trained between 1976 and 1981.

**QUESTION 9:** Does your agency use contractors to perform VE as part of your in-house operations? If so, please describe the extent of the contractor operation.

**ANSWER:**

USCG - The Coast Guard uses VE contractors in the design phase of projects costing over \$2 million.

UMTA - This is not applicable since UMTA administers a program of Federal assistance to other jurisdictions; those jurisdictions undertake any VE contracting that may be appropriate.

FHWA - Much like UMTA, most of FHWA's projects take place in a grant program in which other jurisdictions (i.e., the States) undertake any VE contracting that may be appropriate. However, FHWA also conducts a Direct Federal highway program in which contractors are not used for in-house VE reviews.

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**QUESTION 10:** Is the use of Federal Acquisition Regulation VE clauses mandatory in any agency contracts? Please identify any other mandatory VE provisions applicable to your agency. Has your agency exempted itself or any particular activities or contract types from such clauses? If so, please identify such exemptions and provide a brief rationale for them.

**ANSWER:**

USCG - VE clauses are mandatory in shore construction contracts in accordance with FAR Subpart 48.202. Other requirements are contained in the attached instructions. The Coast Guard has not exempted itself or activities from the VE clause.

UMTA - Not applicable.

FHWA - FAR VE clauses are in all Direct Federal construction contracts. Design work on bridges and selection of pavement types are regularly exempted from VE. Bridge design on Park Service work is governed largely by aesthetic considerations rather than economic criteria and does not lend itself to VE.

**QUESTION 11:** How many VE proposals did your agency receive in each fiscal year 1981 through 1986? Please report in-house and contractor-generated proposals separately, if possible. How many in-house and contractor-generated VE proposals were approved for the same time period?

**ANSWER:**

|                                         |              |              |              |
|-----------------------------------------|--------------|--------------|--------------|
| USCG -                                  | <u>FY 84</u> | <u>FY 85</u> | <u>FY 86</u> |
| Contractor Generated Proposals          | 16           | 18           | 12           |
| Contractor Generated Proposals Approved | 15           | 14           | 12           |
| In-House Proposals                      | 197*         | 9            | 2            |
| In-House Proposals Approved             | N/A          | 9            | 2            |

\* The 1984 in-house figure is high because 1984 was the last year in which USCG used a threshold of \$20,000; it was raised to \$500,000 in 1985 (see Question 3).

UMTA - Because UMTA administers a grant program, proposals would be received by grantees, not UMTA.

FHWA - The data below reflects only Direct Federal VE reviews; appropriate information on the number of VE reviews performed by the 50 States, the District of Columbia and Puerto Rico is not available.

|                           |              |              |              |              |              |              |
|---------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
|                           | <u>FY 81</u> | <u>FY 82</u> | <u>FY 83</u> | <u>FY 84</u> | <u>FY 85</u> | <u>FY 86</u> |
| In-House (Direct Federal) | 1            | 7            | 7            | 0            | 1            | 1            |
| Contractor Generated:     |              |              |              |              |              |              |
| Proposals Submitted       | 5            | 2            | 3            | 3            | 2            | 3            |
| Proposals Approved        | 5            | 1            | 2            | 3            | 1            | 1            |



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QUESTION 12: If available, what is the average time required to process contractor-generated VE change proposals? The average time to process in-house VE proposals? Please include any agency goals or standards associated with these processing times.

ANSWER:

USCG and FHWA - Contractor-generated proposals are processed as quickly as possible with an attempt to meet the 45-day deadline established in the FAR.

UMTA - Not applicable.

QUESTION 13: To what extent do sub-contractor VE proposals contribute to VE savings in your agency?

ANSWER:

USCG - All of our shore construction, which is subject to VE, is done under fixed price contracts. Since we only deal with prime contractors, the extent of sub-contractor VE proposals is unknown.

UMTA - Not available from grantees.

FHWA - The FAR requires the contractor to include a VE clause in certain subcontracts. All contractor-generated VE proposals are handled through the prime contractor and separate accounting is not available.

QUESTION 14: If your agency awards grants to states and local governments for construction projects, what was the total value of these grants for each fiscal year 1981 through 1986? What percentage of the total cost for such projects was paid by the federal grant? Were any VE provisions included in such grants? If so, please describe these provisions and state what savings, if any, were realized, and how these were reapplied.

ANSWER:

USCG - The U.S. Coast Guard does not award construction grants to States or local governments.

UMTA - UMTA's total grants were:

|              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
| <u>FY 81</u> | <u>FY 82</u> | <u>FY 83</u> | <u>FY 84</u> | <u>FY 85</u> | <u>FY 86</u> |
| \$1,755.0M   | \$1,670.9M   | \$1,615.0M   | \$1,616.8M   | \$1,428.0M   | \$1,769.2    |

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Normally the Federal share is 75-80 percent. VE provisions applied to UMTA grants for new rail starts in excess of \$150 million.

The VE grant provisions are described in detail in UMTA's portion of Enclosure C. VE savings are estimated to be approximately \$138.1M from FY 1983 through FY 1986. These savings are returned to the various program accounts.

FHWA - Total Federal-aid obligations, in billions of dollars, for Fiscal Years 1981 through 1986 are as follows:

|                   | <u>FY 81</u> | <u>FY 82</u> | <u>FY 83</u> | <u>FY 84</u> | <u>FY 85</u> | <u>FY 86</u> |
|-------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Total Federal-Aid | 8.65         | 7.84         | 11.60        | 11.57        | 13.77        | 14.06        |

The Federal funds listed above represent various percentages of project costs depending on the class of funds involved. They range from 75 percent to 100 percent of the total cost of these projects. There are no FHWA requirements that the States apply VE to Federal-aid highway projects. However, through our extensive promotional efforts (i.e., workshops, national VE conferences, arrangements for inter-State exchange of VE expertise, etc.), as well as the recent emphasis given to VE by AASHTO, we believe an effective voluntary VE program can be achieved. Many States apply VE to some Federal-aid projects during the design stage, and many of the States have incentive clauses in their construction contracts. No records are maintained at this time on total savings from VE applied at either the design or construction stage.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

MR 13

OFFICE OF  
WATER

Honorable Carl Levin  
Subcommittee on Oversight of  
Government Management  
Committee on Governmental Affairs  
United States Senate  
Washington, D.C. 20510

Dear Mr. Chairman:

This is in response to your letter of February 20, 1987 to Administrator Thomas, concerning the Agency's value engineering (VE) activities. Your letter has been referred to me for reply, since at the present time, the Agency's VE activities are limited to the construction grant program for municipal wastewater treatment facilities. Historically, the construction grant program has accounted for virtually all of the Agency's construction activities. Recently, as construction activities under the Superfund program have increased, we have begun applying VE to Superfund projects, but we have not yet accumulated information on the results of VE in the Superfund program.

My response to your questions includes all VE activities undertaken by Agency Headquarters and Regional Offices, as well as by delegated States under Section 205(g) of the Clean Water Act and by the Corps of Engineers under our interagency agreement with the Department of the Army. For your convenience, I have numbered the information to correspond with your numbered questions.

1. The Agency has a VE program, which applies to all grant projects with an estimated construction cost of \$10 million or more. Voluntary VE studies are encouraged on smaller projects. The following descriptive materials are enclosed:

- a. Regulation 40 CFR 35.926, which applies to all projects which received a Step 2 (design) grant between October 26, 1976 and December 29, 1981.
- b. Regulation 40 CFR 35.2114, which applies to all subsequent projects.
- c. Pages 94-96 of "Construction Grants 1985", which is the VE portion of our basic guidance document for grantees.
- d. Pages 543-546 of the "Handbook of Procedures", which is the VE portion of our operating procedures for the review of grant applications by Agency employees.
- e. "Value Engineering for Wastewater Treatment Works", which is our detailed VE guidance document for grantees.

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2 and 4. The cost of VE studies, including the cost of implementing recommended design changes; the net savings; and the return on investment (expressed as dollars saved per dollar expended) were:

|       | <u>Cost</u> | <u>Net Savings</u> | <u>Return</u> |
|-------|-------------|--------------------|---------------|
| FY 81 | \$2,348,000 | \$ 64,030,000      | 27:1          |
| FY 82 | \$3,910,000 | \$ 76,281,000      | 20:1          |
| FY 83 | \$8,833,000 | \$142,519,000      | 16:1          |
| FY 84 | \$2,949,000 | \$ 98,224,000      | 34:1          |

However, EPA did not pay the entire amount of these costs, since grantees were required to contribute a portion thereof (usually 25 percent). All savings were contractor-generated. We have not yet assembled costs for FY 85 and FY 86, since we are currently redefining the data to be collected, in order to expand the information available on VE efforts and results. This expanded information will, in turn, enable us to better understand the influence of various factors on VE results, thereby enabling us to improve the VE process as it is applied to construction grant projects.

3. We have not established any specific numerical goals for the VE program.

5. All savings are deducted from the total project cost, and the Federal grant and the grantee's contribution are both reduced proportionately. The reduction in the Federal grant amount is returned to the State's allocation of funds, and used to fund the next project on the State's project priority list. Thus, if the grantee's required contribution is 25 percent, the grantee will benefit from 25 percent of the savings, and the State agency (which is responsible for enforcing the VE requirements, encouraging increased use of VE, and reviewing the results) will benefit by having 75 percent of the savings to reapply to another project within the State.

6 and 7. No personnel are assigned full-time to VE. At the present time, an estimated 11.0 full-time equivalents are devoted to VE by the Agency, the delegated States, and the Corps of Engineers (under our interagency agreement with the Department of the Army).

8. Eight or more hours of VE training were provided to the following number of persons:

|            |
|------------|
| FY 81 - 10 |
| FY 82 - 48 |
| FY 83 - 67 |
| FY 84 - 20 |
| FY 85 - 22 |
| FY 86 - 34 |

Again, these figures include employees of the Agency, the delegated States, and the Corps of Engineers.

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9. The Agency has no in-house VE operations.

10. The use of Federal Acquisition Regulation VE clauses is not mandated, nor are any other VE provisions, except for the basic requirement to perform a VE study for certain projects, as described in Answer 1. In unusual circumstances, an exemption from this requirement could be requested under 40 CFR 30.1001 through 30.1005 (copy enclosed), but an exemption from the VE requirement has never been requested.

11. The total number of VE proposals has not been tabulated in the past. This figure, as well as the number of proposals approved by grantees, are two of the parameters which we will be requesting in our VE surveys for FY 85 and FY 86.

12. The average time to process VE proposals is relatively short, since the VE study is normally performed during the design effort, so that timely implementation can reduce both the time and the cost required to incorporate the changes in the design. Although exact figures are not available, we estimate an average time of approximately one month. The Agency has no goals or standards associated with the time required for implementation.

13. To ensure an independent VE effort, we encourage grantees to contract directly with an independent firm to conduct the VE study. Accordingly, we estimate that only ten percent of VE proposals are made by subcontractors to the design firm.

14. The total amount of construction grant funds were as follows:

FY 81 - \$2.3 billion  
FY 82 - \$2.4 billion  
FY 83 - \$2.4 billion  
FY 84 - \$2.4 billion  
FY 85 - \$2.4 billion  
FY 86 - \$1.8 billion

For grants awarded prior to October 1, 1984, the Federal share was 75 percent (except for innovative and alternative technologies, which were funded at 85 percent). For all subsequent grants, the Federal share was 55 percent (or 75 percent for innovative and alternative technologies), although phases or segments of projects whose first phase or segment preceded the October 1, 1984 date were "grandfathered" at the higher rate (75 or 85 percent). The VE provisions included in these grants are described in Answer 1, the savings are described in Answer 4, and the reapplication of these savings are described in Answer 5.

I hope that you find the above information useful.

Sincerely,

*Larry Jensen*

Lawrence J. Jensen  
Assistant Administrator  
for Water (WH-556)

Enclosures



THE DEPUTY SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

26 MAR 1986

VE 130

Add  
Committee

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS

SUBJECT: Value Engineering

It is evident that there is significant untapped potential in the Contractor Value Engineering (VE) Program. Recent briefings to the Defense Council on Integrity and Management Improvement (DCIMI) indicated that only 14 out of 73 Selected Acquisition Report (SAR) programs in FY 1984 had any VE activity. The DoD Inspector General has reported that the DoD Contractor VE Program is yielding only a third or less of its potential. Actions are needed to strengthen this program.

Currently most production contracts utilize the VE Incentive Clause, which is voluntary and supported by contractor funding. This funding is repaid by the government upon the latter's incorporation of the VE change proposal. Because the voluntary clause requires the contractor to fund a proposal to a potentially unreceptive customer, contractors rarely devote sufficient resources to VE. The VE program requirement clause, on the other hand, requires a mandatory VE effort, which is priced and funded as part of the contract.

Pending publication of criteria to assist the contracting officer in making a decision whether to include a VE program requirement clause in such contracts, the program requirement clause should be included in accordance with the criteria provided in the enclosure. The use of this clause must be accompanied by increased program manager emphasis on cost reduction through the use of VE and all other means.

Expanded use of the VE program requirement clause and increased emphasis from government personnel should result in capturing more of the VE potential, as well as supporting continuing acquisition streamlining efforts during the production phase.

W. H. T. 2

William H. Taft, IV

Enclosure

Attachment 5 to the 2  
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EXPANDED USE OF THE VALUE ENGINEERING (VE)  
PROGRAM REQUIREMENT CLAUSE

1. The VE Program Requirement Clause (FAR 52.248-1, Alternatives I or II) should be applied in initial production contracts (first and second production buys) for major system acquisition programs (DoDD 5000.1), except as indicated below. Exceptions to this policy should be made for:

a. Contracts where, in the judgment of the contracting officer, the prime contractor has demonstrated an effective VE program during either earlier program phases, or during other recent comparable production contracts.

b. Production contracts awarded prior to June 30, 1986.

c. Priced options for production which have been established prior to June 30, 1986.

d. Contracts which are awarded on the basis of production competition.

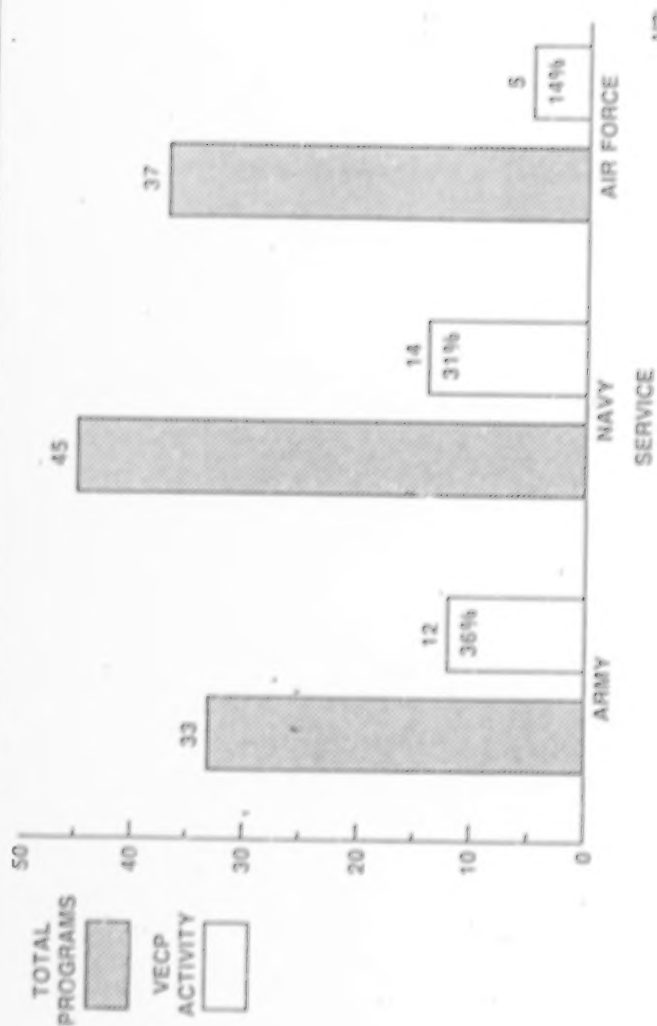
2. Opportunities for use of the VE Program Requirement Clause, in less than major system acquisition programs, should be considered. FAR Part 48.201 should be used for further guidance.



DEPARTMENT OF DEFENSE

# MAJOR PROGRAMS VS. VECP ACTIVITY

FISCAL YEAR 1985



STATEMENT FOR THE RECORD  
OF  
LAWRENCE J. JENSEN  
ASSISTANT ADMINISTRATOR FOR WATER  
U.S. ENVIRONMENTAL PROTECTION AGENCY  
FOR THE  
SUBCOMMITTEE ON OVERSIGHT OF GOVERNMENT MANAGEMENT  
COMMITTEE ON GOVERNMENTAL AFFAIRS  
UNITED STATES SENATE  
APRIL 29, 1987

Mr. Chairman and members of the Subcommittee, I appreciate the opportunity to present this statement on EPA's value engineering (VE) program. I also appreciate this Subcommittee's interest in improving the quality and cost-effectiveness of federally-assisted projects through the use of VE. As you are aware, VE is being used with increasing frequency in both the public and private sectors, in order to improve project quality and reduce costs.

A VE study provides an independent review of facility design, using an organized methodology which focuses on examining high costs, required functions, and creative alternatives.

History of EPA's VE Program

We at EPA are pleased with the results of our VE program in the municipal wastewater construction grants program. The Agency instituted its VE efforts in 1974, when we began encouraging communities to use VE on a voluntary basis. The success of these early VE efforts led us to mandate VE through regulation, beginning in September 1976, for all new projects with an estimated

construction cost of \$10 million or more. In December of 1981 these requirements were incorporated into our authorizing legislation when Congress enacted the Municipal Wastewater Construction Grants Amendments of 1981 (Public Law 97-117). To this day, our VE program is the only federal VE program mandated by law.

Under the Clean Water Act of 1977, EPA administers the construction grants program in cooperation with the states. Through delegation of specific functions to the states, EPA is able to administer the program more efficiently and effectively. The VE function has now been delegated to most of the state water pollution control agencies, and in many states, the state VE Coordinator is present for at least part of each VE study.

#### Results of the Existing VE Program

As an initial effort, our VE program has produced impressive results. In the first eight years after we initiated a mandatory VE program (Fiscal Years 1977 through 1984) a total of 346 studies have produced capital savings of over half a billion dollars, at a total cost of only \$30 million. This represents a savings of \$18 for every dollar spent on VE, and an average savings of six percent of the original capital cost.

Some individual projects, of course, demonstrate much greater savings. For example, a 1985 VE study on a \$5 million project in Albuquerque, New Mexico, yielded savings of over \$1.3 million, or 26 percent of the original cost.

Our VE program has made excellent progress over the years, especially in the savings-to-cost ratio. Beginning with a 12:1 ratio in Fiscal Year 1977, the average ratio has been trending upward, with a 34:1 ratio reported for Fiscal Year 1984. We also see a significant percentage saving--averaging about six percent a year--in the cost of the projects which were subject to VE. In addition, VE frequently results in significant improvements in the quality of projects.

Even looking at cost savings alone, there is a compelling reason for using VE. The VE study is, in effect, free to the community, since the community's share of the savings will more than pay for the cost of the VE study. The remaining savings can then be used for other purposes in the community.

There is also a significant EPA interest in the VE program, since the federal share of the average six percent savings can be used to fund wastewater treatment projects in other communities, thus enhancing water quality in more locations. The states also have an interest, since the federal grant funds that are saved remain in the state, to be used only to assist other communities in that state, thus improving the state's water quality.

We have received no complaints about our VE program. One reason for this is that local managers are clearly in charge. Although we mandate a VE study, we do not dictate specific details of the study. The choice of VE team members, for

-4-

example, is left to the community. Similarly, while the communities are required to perform a VE study, they are not forced to implement all recommendations. Any community with a reasonable explanation can--and does--reject those recommendations which it considers to be inappropriate.

#### Efforts to Improve the VE Program

We have embarked on a program to increase the utilization of VE. This program includes:

1. The appointment of State VE Coordinators, in order to give communities in each state a local point of contact for VE information and assistance. So far, 49 states have designated a State VE Coordinator, as have the District of Columbia and Puerto Rico.
2. The development of a new guidance document, "Value Engineering for Small Communities," which explains VE in basic, non-technical terms, and includes specific examples of VE recommendations which have been successfully implemented on smaller projects. We are now in the final editing stages, and expect to have the document printed and available by the end of May.
3. The presentation of six VE seminars at our Regional Offices in Philadelphia, Atlanta, Dallas, San Francisco, Boston, and Chicago. In fact, the last of these seminars was presented yesterday in Chicago.
4. The execution of a detailed study of the costs and results of recent VE studies (for Fiscal Years 1985 through 1987). The results of this study will be used to increase our knowledge of the effectiveness of VE on various sizes of projects, and to direct management attention to areas with high potential for greater VE savings.
5. The encouragement of voluntary VE on projects costing less than \$10 million.

Lowering the Limit for Mandatory VE

Based on our experience, we believe that there are several compelling advantages--and no disadvantages--of requiring VE on smaller projects. On smaller projects, of course, a lower savings-to-cost ratio must be expected.

We believe that a strong argument can be made for lowering the limit for required VE studies to \$5 million, and that a weaker argument can be made for lowering it below that level. We believe that the \$5 million limit would produce both significant savings and significant improvement in project quality, while requiring a manageable increase in the workload required--by the communities in performing the studies, and by EPA and the states in assisting the communities and reviewing the results. We believe that a lower limit would result in diminishing returns, since we would be putting a lot more effort into these smaller projects in which there is only a limited potential for savings. This would be especially true in some of the less complex treatment processes, such as lagoons, which are by their nature low in cost.

Funding of VE

I would now like to address two specific questions which have been raised by the Subcommittee about our VE program. First, whether we should use savings realized by VE to fund our VE program. We are strongly opposed to this suggestion

because these funds can better be used to fund other wastewater treatment projects. We are already funding the VE activities of the states through Section 205(g) of the Clean Water Act, which allows up to four percent of each year's authorized construction grant funds to be awarded to the states for administration of the program, and we do not believe that additional funds are needed for this purpose.

The second question is whether we should provide advance funding to grantees who perform voluntary VE studies. We are also opposed to this suggestion since we already have a system of cash advances to small communities to assist them in performing planning and design work. Since VE is a relatively small portion of the total design cost, we do not believe that a lack of funds would constitute a barrier to the performance of a VE study.

#### Use of VE in Superfund and Other Programs

Before concluding, I would like to mention that the Agency is now using VE for Superfund projects on a voluntary basis. We are enthusiastic about the use of VE in Superfund, since many of these projects are unusual in nature, and we believe that VE has great potential for identifying the best methods of completing these projects. At this time, we have not accumulated sufficient experience to enable us to evaluate the results of using VE in Superfund. We would caution you against mandating the use of VE--in Superfund or in any other federal program--until



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enough experience has been accumulated to allow you to objectively evaluate the results since each federal program has its own unique features.

In conclusion, I would like to again express my appreciation for the Subcommittee's interest in our VE program.

TABLE 1

## VALUE ENGINEERING RESULTS

| <u>Fiscal Year</u> | <u>Number of Studies</u> | <u>Capital Cost<br/>Before VE*</u> | <u>Accepted<br/>VE Savings*</u> |
|--------------------|--------------------------|------------------------------------|---------------------------------|
| 1984               | 73                       | 1,770,306                          | 101,173                         |
| 1983               | 76                       | 2,143,252                          | 151,352                         |
| 1982               | 58                       | 1,174,578                          | 80,191                          |
| 1981               | 39                       | 943,378                            | 66,378                          |
| 1980               | 18                       | 490,229                            | 18,004                          |
| 1979               | 31                       | 807,220                            | 48,354                          |
| 1978               | 23                       | 501,897                            | 23,532                          |
| 1977               | 28                       | 1,456,700                          | 79,958                          |
| Total              | 346                      | 9,257,560                          | 568,942                         |

| <u>Fiscal Year</u> | <u>Cost of Study<br/>and Changes</u> | <u>Net VE Savings</u> |           | <u>Savings to<br/>Cost Ratio</u> |
|--------------------|--------------------------------------|-----------------------|-----------|----------------------------------|
|                    |                                      | <u>*</u>              | <u>**</u> |                                  |
| 1984               | 2,949                                | 98,224                | 5.7       | 34:1                             |
| 1983               | 8,833                                | 142,519               | 7.1       | 16:1                             |
| 1982               | 3,910                                | 76,281                | 6.8       | 20:1                             |
| 1981               | 2,384                                | 64,030                | 7.0       | 27:1                             |
| 1980               | 1,061                                | 16,943                | 3.7       | 16:1                             |
| 1979               | 3,287                                | 45,067                | 6.0       | 14:1                             |
| 1978               | 1,660                                | 21,872                | 4.7       | 13:1                             |
| 1977               | 6,354                                | 73,604                | 5.6       | 12:1                             |
| Total              | 30,402                               | 538,540               | 6.1       | 18:1                             |

\* Thousands of Dollars

\*\* Percent of Capital Cost Before VE



# American Consulting Engineers Council

1015 Fifteenth Street, N.W., Washington, D.C. 20005

202-347-7474

April 30, 1987

The Honorable Carl Levin  
Chairman, Subcommittee on  
Oversight of Government Management  
Committee on Governmental Affairs  
442 Hart Senate Office Building  
Washington, D.C. 20510-6250

RE: Value Engineering

Dear Mr. Chairman:

On behalf of the American Consulting Engineers Council (ACEC), I would like to formally submit for the record our statement regarding value engineering (VE) in federal agencies, which was the subject of a subcommittee hearing on April 29, 1987.

ACEC commends the Chairman for holding hearings on this important matter, which has not received the type of support and understanding commensurate with the benefit value engineering has in reducing unnecessary costs on government programs.

It is clear from the testimony before your subcommittee and the record of savings resulting from value engineering that it is a process that must be encouraged at all government levels and performed whenever possible.

## INTRODUCTION

ACEC is an association representing some 4,600 private practice consulting engineering firms with approximately 130,000 employees who are responsible for the design of billions of dollars of federal projects. Very often, our member firms actually perform value engineering for programs or are the subject of such a process. As a result, our members know the benefits to be achieved when considering alternatives and various approaches to solving problems.

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ACEC is sensitive to the fundamental need for efficient and effective delivery of services within tight budget constraints. For this reason it has championed the cause of qualifications-based selection (pursuant to P.L. 92-582) and the use of value engineering whenever feasible.

ACEC's policy position on value engineering states that it "supports the practice of Value Engineering by an independent qualified team from within the design firm or from a separate firm as appropriate, with extra payment for the efforts of the Value Engineering team and the extra efforts of the designers for their cooperation and response."

ACEC's position also raises an important element when it concludes "the greatest number of options and the greatest potential for improving the project design without sacrifice of legitimate project requirements are available during the study and preliminary design phases. Consequently, Value Engineering can best serve the client, the public, and the design professional when applied to the early design stages." (Emphasis added). (See Policy Statement attached).

#### DISCUSSION

Mr. Chairman, during the subcommittee hearings you raised a very basic yet fundamental question -- If value engineering is as effective as claimed (OFPP estimates \$2.5 billion in savings during fiscal 1986), then why aren't more programs being VE evaluated?

From ACEC's perspective, the following are the most important impediments to the use of value engineering:

- (1) The single most important hindrance to value engineering is the "timing." As noted, VE is most effective when applied early in the process or program. It is at this point that alternatives can be most readily applied without disrupting the project.

However, while early use of value engineering is most propitious, it is also the point at which a great deal of pressure is applied to obligate construction funds.

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Thus, design VE is not always used or favored since it has the potential of delaying the signing of construction contracts. If greater lead time is provided on projects for the design aspects, not only would VE be possible--but the number of alternatives and choices provided by the design firm on the project would be improved.

- (2) In ACEC's view, the current regulations as stated in the Federal Acquisition Regulation (FAR) have a negative impact on the use of value engineering. This is particularly true for design VE. The FAR provisions impact VE for design professional contracts at two levels:

- o First, subpart 48.201(f)(1) restricts the use of VE when it states "incentive sharing may be used in solicitations and contracts for architect-engineer services only when specifically authorized by agency acquisition regulations."

Under FAR rules such an authorization shall not be included for contracts that are: (1) for research and development; (2) for engineering services from not-for-profit or nonprofit organizations; (3) for personal services; (4) providing for product or component improvement; (5) for commercial products; or (6) when the agency head has elected to exempt the agency or a category of contracts. (See FAR subpart 48.201(a)).

- o Second, the FAR creates different levels of return on net acquisition savings depending upon the alternative types of contracts used for a project.

Thus, there is a disincentive for the contractor to voluntarily do any VE on cost reimbursement type contracts since it retains only 25 percent of the savings as opposed to 50 percent on other types of contracts. [See Chart below]. As cost reimbursement type contracts increase in use, the negative impact of this differentiation will increase.

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# GOVERNMENT/CONTRACTOR SHARES OF NET ACQUISITION SAVINGS

(figures in percent)

| Contract Type                                  | Sharing Arrangement              |                                          |                                       |                                                           |
|------------------------------------------------|----------------------------------|------------------------------------------|---------------------------------------|-----------------------------------------------------------|
|                                                | Incentive<br>(voluntary)         |                                          | Program<br>requirement<br>(mandatory) |                                                           |
|                                                | Instant<br>con-<br>tract<br>rate | Con-<br>current<br>and<br>future<br>rate | Instant<br>con-<br>tract<br>rate      | Con-<br>current<br>and<br>future<br>con-<br>tract<br>rate |
| Fixed-price (other than incen-<br>tive)        | 50/50                            | 50/50                                    | 75/25                                 | 75/25                                                     |
| Incentive (fixed-price or cost)                | *                                | 50/50                                    | *                                     | 75/25                                                     |
| Cost reimbursement (other than<br>incentive)** | 75/25                            | 75/25                                    | 85/15                                 | 85/15                                                     |

\*Same sharing arrangement as the contract's profit or fee adjustment formula.

\*\*Includes cost-plus-award-fee contracts.

Given the fact that contractors cannot recover the cost of any VE efforts not accepted by the government, and given that less than half of those VE proposals are in fact accepted -- it is not hard to see why VE efforts are not voluntarily done on many contracts.

## CONCLUSION

As has been noted, ACEC strongly supports the concept of value engineering, particularly when included in the early stages of a project or program. The current regulations and rules which affect the use of VE should be carefully reviewed and revised so as to remove disincentives and "opt-outs" for entire agencies or categories of contracts.

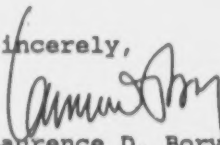
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The procurement of the most qualified and competent consulting engineer or design professional to do value engineering can provide real benefits to the government.

ACEC welcomes the opportunity to work with your staff and Mr. Bedell's office to develop and design a workable value engineering program. We believe it is a worthy process that should be utilized more often by the government in providing alternatives and choices that may save the taxpayers money.

We appreciate your interest in and consideration of our position on value engineering.

Sincerely,

  
 Laurence D. Bory  
 Managing Director  
 Governmental and  
 International Affairs



POSITION STATEMENT ON VALUE ENGINEERING

Sound economical design is the cornerstone of competent engineering practice. The engineering profession, therefore, supports all efforts to encourage design of facilities that meet established project criteria for performance, reliability, low maintenance, and operation at the lowest total life-cycle cost. Accordingly, ACEC supports the incorporation of an established procedure--Value Engineering--in the design of projects for which the additional cost and time may be justified.

Value Engineering is an analytical process by which a team not connected with a design independently reviews that design to seek improved project quality and reductions in the total cost, considering the initial investment and present worth of the ongoing costs over the life of the project. ACEC supports the practice of Value Engineering by an independent qualified team from within the design firm or from a separate firm as appropriate, with extra payment for the efforts of the Value Engineering team and the extra efforts of the designers for their cooperation and response.

The greatest number of options and the greatest potential for improving the project design without sacrifice of legitimate project requirements are available during the study and preliminary design phases. Consequently, Value Engineering can best serve the client, the public, and the design professional when applied to the early design stages. Additional savings, on a lesser scale, are possible during the preparation of construction drawings and specifications. Value Engineering, after completion of final contract documents, is generally not cost effective.

It is recognized that the benefits of Value Engineering will be dependent upon the criteria, parameters and scope for which the owner contracts. The results will also generally be proportional to the objectivity and experience of the persons and to the amount of funds and time authorized for the Value Engineering process. The owner should recognize that Value Engineering increases his role as a participant in the design process as he encourages differences in professional opinion and may have to choose between recommended alternatives.

Adopted May 8, 1975

Rev. and Approved May 14, 1984